NINETY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

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THE IRON AGE

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RAILS · TRACK ACCESSORIES
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In oval: *Eighteen 500-gallon milk tanks made of* ENDURO *by Lee Metal Products Company, Inc., Philipsburg, Pa.*

At right: *Laundry truck tub made of* ENDURO *by Ellis Drier Co., Chicago, Ill.*

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MARCH 22, 1934

ESTABLISHED 1855 Vol. 133, No. 12

"Sow the Wind And Reap the Whirlwind"

IF the Administration and Congress are wise, they will "stop, look and listen" carefully before proceeding further to set employers and employees at swords' points.

A serious mistake was made and the "wind was sown" in the early days of the New Deal by leading organized labor to believe that it had been given a Governmental mandate. It was encouraged to think that to demand was to receive, with the sky as the limit.

"Sow the wind and reap the whirlwind." That adage is as true today as when it was first coined. The wind of impractical, impossible promises that was sown nine months ago is now gathering force on the threatening industrial horizon.

Said one union official at a Labor Board meeting last week: "Detroit is almost like a tinder box with tens of thousands of employees waiting to go on strike."

If you had told any one of these discontented "tens of thousands" a year ago that he could have the privilege of steady work at higher pay than since 1929, he would have called down blessings on your head. That was the state of mind before the political demagogues and the impractical social minds sowed the wind of discontent.

Today, with steady work and high pay, many men threaten to quit their jobs in a squabble with employers over union recognition.

In our opinion, it is not a question of the closed versus the open shop or of the desirability or otherwise of unionization. It is a question of the impracticability of forcing drastic social changes where there is a large body of strong and honest conviction on either side and a definite historical background.

In the historically open shop metal-working industry we believe that the price of forced unionization would be the wrecking of the recovery movement now gaining impetus day by day, just as surely as this would happen if Government pressure were applied to abolish unionism in industries where it has earned legitimate foothold and power.

Employers, of course, are in a minority but it must be remembered that there are many millions of workers who are not willing to accept union rules, seniority and uniform wage scales or to pay union dues, and that these constitute a huge majority that may become politically articulate.

Senator Wagner's bill which proposes to modify Section 7a of the Recovery Act in favor of the closed shop is an admission that even with heretofore unheard of Government backing, not to say bludgeoning, union organizers have failed to alter the thought and action of this large independent majority.

Let Congress think twice before it invites the whirlwind by passing this bill.

J. W. Vanderventer

. . . Zinc for Steel

By HERBERT R. SIMONDS

MANY factors in connection with galvanizing are controversial. These include the protection value of zinc alloys as against that of pure zinc, the best thickness of coating for specific applications, and the importance of the bond of zinc with the base metal.

In Europe, and especially in England, some rather heated debates have taken place on the relative merits of electro- and hot-dip galvanizing. In this country, although practice and theory differ to some extent from that of Europe, many authorities also have divergent opinions, and the accompanying symposium attempts to analyze some of these.

This article is in part an answer to certain questions raised in the first article dealing with the same subject which appeared in THE IRON AGE of November 16, 1933.

SOME proponents of electro-galvanizing have given the impression that a zinc coating electrically deposited on metal, because of its greater purity, is more corrosion-resistant than an ordinary hot-dip zinc coating. This, according to W. H. Finkeldey, is contrary to the best published data in this country on the corrosion of zinc coatings. In support of this, Mr. Finkeldey states:

"The Bell Telephone Laboratories, the research group of perhaps the largest individual consumer of galvanized products in the world, has made a number of laboratory and outdoor exposure tests of all types of zinc coatings. In these the weight losses for the different kinds of zinc coatings were practically identical at 2.25 milligrams per square centimeter. Likewise the losses for the two kinds of zinc were almost equal at 3.25 milligrams per square centimeter.

"It is significant that the pure high-grade zinc sheet lost *more* than the most impure (high in iron-zinc alloys) of the zinc coatings. The losses for electro-deposited zinc coatings on steel sheets after one year's exposure to the same atmosphere and at the same time were 2.25 milligrams per square centimeter for a zinc coating deposited from a cyanide bath, 3.2 milligrams per square centimeter for a coating from a cyanide bath using mercury-zinc anodes, and 3.6 milligrams per square centimeter for a coating from a sulphate bath."

Thickness of Coating Important

The investigations of Committee A-5, American Society for Testing Materials, on the atmospheric corrosion of zinc coatings, which Mr. Finkeldey feels are the most comprehensive tests ever made, do not support the contention that electro-deposited coatings are more resistant to corrosion in the atmosphere. In the 1933 report, this committee, in summarizing the tests of electro-deposited and other types of zinc coatings on hardware samples, states:

"The resistance to corrosion of these zinc coatings depends substantially on the weight of coating and not on the process by which these coatings were applied."

It may be that in Europe a thin coating of zinc put on by the electro-galvanizing process will withstand corrosion better than a thicker coating put on by the hot-dip process, as the European manufacturers claim, but Mr. Finkeldey says it will take better evidence than just the foregoing flat statement to convince those who have had experience in this country.

Zinc-Iron Alloys

The Langbein-Pfanhauser Werke in Leipzig says, in the course of a discussion on the purity of the hot-dip zinc bath and the coatings produced, "It has always been a problem in hot galvanizing to keep the formation of zinc-iron alloy to a minimum." Mr. Finkeldey points out that the inference is that galvanizers consider these iron-zinc alloys detrimental to the corrosion resistance of the coating. This idea, he says, will come as a shock to the galvanizers in this country who have made thousands of tons of wire for farm, field and railroad right-of-way fencing on which the zinc coatings were composed entirely of iron-zinc alloys. Also, he believes the manufacturers of "galvannealed" wire, who deliberately convert the pure zinc part of the coating of iron-zinc alloys, will be equally surprised. Incidentally the experience of consumers has shown that these products, when they carry sufficient zinc coating, have shown excellent resistance to atmospheric corrosion.

In a previous article the statement was made that electro-galvanized wire can be distinguished from hot-galvanized wire by immersion in a 5 to 10 per cent sulphuric acid solution and that the former will outlast the other by three to four times. The rate at which zinc coatings dissolve in sulphuric acid, according to Mr. Finkeldey, is no measure of their performance in the atmosphere. "Anyone," he states, "who has made chemical analyses of zinc knows that it takes longer to put a sample of Horse Head zinc in solution in dilute sulphuric than it does a sample of Prime Western zinc, and still longer to dissolve a sample of C. P. zinc of the 99.99 grade.

"Interesting as this may be," continues Mr. Finkeldey, "it is no indication of the corrosion resistance of these materials in the atmosphere, as the previously mentioned Bell Telephone Laboratories' tests have shown; also the recent report of Committee B-3 of the A. S. T. M., which gives the same loss in weight for commercial high-grade, Prime Western, and 99.99 grade of rolled zinc after one year's exposure to the atmosphere."

Thin Coatings in Sweden

The Langbein-Pfanhauser company also states that, in outdoor service, its experience indicates that a coat of from 2 to 2.4 oz. per sq. yd. will give satisfactory corrosive protection for many years, as indicated by the Swedish Telephone service. Converted to terms usually used in this

Protection — 2

country, it corresponds to 0.22-0.27 oz. per sq. ft. which is one-fourth to one-third the weight of the coating called for in the specifications of our telephone and telegraph companies. Mr. Finkeldey asks, "Why would American engineers put three to four times as much zinc coating on their line and strand wire as the Swedish engineers if there were not good reasons for so doing?" "The real answer to all this," he says, "is that a 0.25 oz. per sq. ft. coating is not as good as a 1 oz. per sq. ft. coating, irrespective of the composition of the coating."

Mr. Finkeldey continues:

"The statement that the thinner the zinc coating, the less likely it will be to crack under bending, is generally true for ordinary commercial galvanized coatings, but the converse does not necessarily hold for special-process galvanized wire. Zinc-coated wire running 1 oz. per sq. ft. by the Crapo process will wrap on its own diameter without visible cracking, as will the new electro-galvanized wire being produced by the Bethlehem Steel Co. with coatings up to 2.50 and even 3.00 oz. per sq. ft. It has been my observation that all galvanized coatings crack, but the cracking is not always visible to the naked eye.

Cracked Coatings Protect

"A distinction should be made between cracking and flaking or spalling, since the former has no great effect on the corrosion resistance of the coating as long as the coating is still firmly adherent to the steel base. There are atmospheric corrosion tests in progress at the present time on severely bent heavy and light coated galvanized sheets, where heavy coatings, although badly cracked, are still, after several years, protecting the base metal over the deformed areas, while the light coatings showing no visible cracks have corroded so badly that the base metal is rusted.

"There is no reliable published evidence that electro-deposited zinc coatings are either superior or inferior, for ordinary commercial use, to an equal weight of coating applied by the hot-dip process. For such special service as the coating on wire rope, where the wires are subjected to alternate bending stresses in service, the electro-deposited coating is superior to a hot-dip galvanized coating. This is probably because the latter in alloying with the steel base roughens and actually notches the steel in many places, which quite naturally lowers its resistance to fatigue."

The European Viewpoint

In answer to some of the points raised by Mr. Finkeldey, A. Weisselberg, consulting engineer, representing, in this country, the Langbein-Pfanhauser-Werke, of Leipzig, states:

"The claim that pure zinc is the best protection for iron and steel against corrosion did not originate with those who advocate electro-galvanizing, but rather with the exponents of the Crapo processed hot-dipped wire, who have frequently featured this claim in their advertisements in Great Britain. The claim as it stands, however, may be reconciled with the findings of the Bell Research Laboratory, which in part indicate that there is no difference in the weathering rate between the outer zinc layer and the inner zinc alloy layer. Stated differently, this means that the inclusion of some iron in a zinc coating has no appreciable effect on the corrosion-resisting property of the coating as a unit.

"This, however, does not mean, as Mr. Finkeldey apparently believes, that the conversion of zinc to zinc-iron is actually desirable and should be deliberately promoted, and I doubt very much that such a conversion is the main object of the manufacturer of 'galvannealed' wire. To my knowledge the annealing operation after the dip serves the purpose of increasing the ductility and adherence of the zinc coating and the conversion of zinc to zinc-iron during this annealing is incidental and it would be making a virtue out of a necessity to claim otherwise."

Avoiding Brittleness

At this point the question naturally arises as to just how far the conversion of zinc to zinc-iron alloy can be carried without affecting the corrosion resistance. Apparently definite data in this field are lacking and perhaps after all it is not important, because another factor enters before the amount of iron in a zinc-iron alloy becomes great enough to materially affect the corrosion resisting properties. This factor is brittleness. Mr. Weisselberg states that, under normal conditions, the greater the proportion of iron in a zinc coating, the greater the brittleness of the coating, and it is in this connection that the Langbein-Pfanhauser-Werke has stated:

"It has always been a problem in hot-galvanizing of wire to keep the formation of the zinc-iron alloy to a minimum, and we believe that the electro-galvanizing process is the only one which will yield a satisfactory pure zinc coat."

Mr. Weisselberg says further that it is true that the rate at which a zinc coating will dissolve in sulphuric acid is no measure of its resistance to atmospheric corrosion. The sulphuric acid dip test is merely a convenient way of determining whether a wire is electro-galvanized or hot-dip galvanized, and of course should be considered as having no other value.

Uniformity and Minimum Thickness

Concerning the claim that electro-galvanized wire need not have as

heavy a coating as hot-dip galvanized wire to give equivalent service, Mr. Weisselberg feels that there is a strong basis of fact back of this. The reason is that the weight of the coating is more uniformly distributed on electro-galvanized wire and that therefore it takes a heavier total coating on the hot-dipped wire to give the same minimum thickness. This of course applies only to round wire. In none of the tests referred to by Mr. Finkeldey does he state that wire was actually used. Mr. Weisselberg says:

"I understand that tests carried out with different specimens of round wire are being made for the first time this year and I feel that there is sufficient ground to suspect that the outcome of these tests will be at variance with the results of tests obtained with sheets and other specimens. In any case I feel that it is a good policy, in the absence of proof to the contrary in this country, not to disregard altogether the knowledge and experience gained on this very subject through many years of actual practice in other parts of the world."

Importance of Coat Thickness

It is an open question whether or not there is any advantage in a pure zinc coat over a coat constructed of a zinc-iron alloy, according to W. H. Spowers, Jr., consulting engineer, New York, who discusses this same subject and who finds that very detailed and accurate tests made under the best auspices have not indicated any decided advantage in either type of coat. One of the largest manufacturers of wire in this country, he states, produces a coating very high in iron content which in many respects is a product of exceptional merit.

Bending Ability a Factor

The problem is not to secure thin coats, but to achieve heavy coats with the resulting service which will at the same time achieve practical bending ability.

The statement that "a thin coating of zinc put on by the electro-galvanizing process may withstand corrosion better than a thicker coating put on by the hot-dip process," in Mr. Spowers' opinion cannot be credited by those versed in the subject. The security of any base metal coated with zinc for protection, he adds, depends upon the thickness of the zinc coat and the length of time it will take for the atmosphere to corrode this zinc coating. This, he feels, is one of the oldest and best proved statements in the art of zinc protection.

Heat Transfers

IN a heat transfer symposium conducted by the American Society of Mechanical Engineers at its annual meeting in New York one of the contributions from the iron and steel field was devoted to the heating problems of the open-hearth furnace. This came from G. W. Putnam, Republic Steel Corpn., Youngstown, and proved to be a notably comprehensive analysis that recognizes the scientific approach to furnace operation. Substantially in full, Mr. Putnam's paper was as follows:

Advocates Blowers for Supplying Air

While most furnaces have ample capacity for inducing sufficient combustion air after the heat is melted and the up-takes are hot, these same furnaces may be deficient in this capacity when the checkers and up-takes are relatively cold during the melt down stage. For these reasons, to insure an adequate supply of air at all periods of the heat, it is best to introduce the air going into the furnace by means of a blower fan. Then by proper orifice measurement and control dampers, it is possible to introduce the exact amount of air needed for combustion at all stages of the operation.

Another marked advantage of using the fan is that the areas in mixing ports may be reduced to produce higher in-going air velocities, which in turn aid in producing faster mixing of air and fuel and result in shorter flames and more intense combustion on the in-going end of the furnace.

From a direct economy standpoint, through reduced fuel input and higher flame temperatures, it is important to impart to the brickwork of the regenerative system all of the heat possible from the waste gases before they get to the stack and thus to provide for maximum preheating of the in-going air. Highly preheated air results in quicker combustion, shorter flames, higher flame temperatures and, if the flame is properly placed, greater and faster heat transfer to the bath.

Because of these facts it is desirable to go to the temperature limit of the regenerative refractories to obtain this desired preheat. The problem involved is to obtain the heat transfer both from the waste gases to the refractories and from the refractories to the in-going air.

Checker Volumes, Depths and Area

To remove sufficient heat from the out-going gases to lower the stack temperature to about 700 deg. F., a checker volume of between 80 and 120 cu. ft. per ton of steel produced is required. This, however, depends on the proportioning of the checkers, as the practical problem of length of furnace run before clogging of brickwork enters into the design. The time the gases are in contact with or adjacent to the checker work, which involves the length of travel through the checker work, are the most important factors in the completeness of heat transfer. To obtain long time of contact it is necessary to have long passages or low velocities, since it is not practical to spread checkerwork over too great horizontal areas. Passages through checkerwork should be not less than 30 ft. This length of travel is obtained through deepening checker chambers, installing multiple passes, or installing secondary regenerators or a combination of all three.

The horizontal area of the primary regenerators should be not less than 4 sq. ft. per ton, to allow sufficient free area to prevent clogging and permit long furnace campaigns before cleaning. There are, of course, other factors that effect amount of flue dust accumulated, such as type of fuel, volume of gases, velocity of gases leaving the hearth and the various areas through which the gases travel.

Heat transfer is made the more nearly complete by increasing the area of brick surface exposed to the gases. For this reason many sizes and shapes of brick have been produced and numerous ways of laying have been devised. Surfaces exposed per cubic foot of checker work vary from 2 sq. ft. to 6 sq. ft. and free areas per square foot of horizontal checkers area vary from 0.20 to 0.60 sq. ft., while some of the patented checkers give both a large exposed area and a large free area, their disadvantage lies

in Open-Hearth Furnaces ▲ ▲ ▲

in a low salvage value. One of the ways to increase the free area without decreasing the exposed area, is to use thinner brick, 2½ in. to 3 in. in place of the 4½-in. block. This allows for 1¼ in. to 1½ in. for effective heat penetration while on 12 to 15 min. reversals, thus permitting considerable increase in effective checker volume, exposed heating surfaces, with the same free area.

Very good combinations of free area and exposed surface can be gotten by the various ways standard 9 × 4½ × 2½-in. brick can be laid. The combination giving 4 sq. ft. of exposed surface and 0.50 sq. ft. of free area is practical and effective.

Port Design Locates Point of Maximum Temperature

At all points of the furnace the flame temperature should be as high as possible within the working limits of the refractory, resulting in the highest mean temperatures possible and practicable across the length and width of the bath. If the maximum flame temperature is developed too early, the in-going end of the furnace will develop a hot spot and the outgoing end will be relatively cold, resulting in a low mean temperature over the hearth and burnt-out ends, owing to the maximum flame temperature developing too near the in-going neck. If the flame maximum temperature is developed too near the outgoing neck, the same results are noted, except the end refractory suffers more as the burning and melting of brickwork continues on into the downtakes and may reach the checkers if the condition is bad.

The location of the combustion and maximum flame temperature is controlled by the design of the port. As the speed of the combustion is governed by the velocities, preheat, and rapidity and completeness of mixing of the air and fuel, ports must be designed with these factors in view. Furnaces with long mixing chambers, i.e., the distance from the end of the hearth to the end of the furnace, require less care in port design than do furnaces that have short mixing chambers where the intimate mix must be got in a short distance of travel and consequently in a shorter time.

The design of ports for each kind of fuel is distinctly different but the object is the same,—to develop a high flame temperature at the right point over the bath.

Controlling Air-Fuel Ratios

In the past it has been the practice in open-hearth furnaces to develop flames by using large amounts of excess air but since reliable automatic air-fuel-ratio controls have been introduced in combination with accurately metered fuel and air, it has been found possible to reduce the amount of air for combustion to the point where the waste gases show as low as 0.2 per cent oxygen with excellent results.

OUTSTANDING points of the accompanying article include the conditions that should obtain in the gases over the open-hearth bath, such as velocity, the development and location of maximum temperature and the character of the flame. Limiting proportions of the bath and checker work are set down. Use of blowers for the air supply and control of the furnace pressure and of the air-fuel ratio are advocated. The heat angle of the bath in the different stages of the steel making process is explained at length. The paper is a notable contribution on furnace heat conservation and utilization.

The advantage accruing to these minimum amounts of air for combustion are: Less volume of gases to handle through the system; higher preheat temperatures; higher flame temperatures; lower velocities; less wear on brickwork, and less flue dust carried into the regenerators.

It is important that the air preheat on each end of the furnace be regulated so that it is identical as to maximum and minimum temperatures between reversals. This prevents overheating of regenerators, gives uniform flame temperature and results in the furnace being run with uniformly higher and constant flame temperatures than it would if one end was working hot and the other end cold. This condition can be obtained by the use of an automatic reverse mechanism actuated by a temperature difference control.

Importance of Automatic Pressure Control

To carry the furnace atmosphere at zero pressure and zero draft at all times insures against loss of heat out of the furnace due to excess pressure and prevents cold air being drawn into the furnace due to excess draft, which lowers flame temperature. This job cannot be done manually with any degree of efficiency due to the many changes that are constantly going on in the bath, but can be accomplished continuously by an automatic pressure control actuating the stack damper.

There is still considerable opposition to automatic controls among open-hearth men and this is due to the fact that there are many furnaces giving excellent performance without the use of them. However, these same furnaces would undoubtedly do better if controlled because of the facts enumerated above.

If the factors necessary to economically produce high flame temperatures have been successfully met, the greatest step has been taken in attaining rapid heat transfer to the bath, which in turn results in increased production and lowered fuel consumption. There are, however, a considerable number of other factors to be taken into consideration, many of which explain the conflicting results reported from plants where the same applications have been made.

The Semi-luminous Flame

Because of the fact that a luminous flame is highly radiant and most of the heat absorbed by the bath is radiated heat, the luminous flame is supposed to be more effective in transfer of heat to the bath. This is true if the non-luminous flame in comparison is of the same temperature as the luminous one. However, a highly lu-

minous flame is of comparatively low temperature and too near the temperature of the bath to be of great benefit. To be most effective, the highly luminous flame must be increased in temperature until it is semi-luminous, then the principle of radiated heat transfer, i.e., transference varying with the difference of the fourth powers of the temperatures of the radiating and recipient surfaces, is practically demonstrated.

During the melt down stage, the high-temperature non-luminous flame is as effective as the luminous flame in transferring heat to the charge. However, after the heat is under cover the high-temperature luminous flame is most effective. This is probably due to the fact that most of the heat is transferred through conduction by direct contact with the cold charge during the melt down and most through radiation after the heat is under cover.

Turbulence, which is produced by the correct design of ports in which the air and fuel streams are jointly entrained, is of considerable importance, both in the fact development of a high-temperature flame and in conduction heat transfer after the flame is over the bath. Flame temperature development is owing much to the intimate mix caused by the turbulence and the faster heat transfer characteristic arises from the rubbing action of the highly heated gases on the surface of the bath.

Flame size, area and shape, have some bearing on the rate of heat transfer and should be controlled as much as possible. Since the maximum flame temperature should be reached approximately two-fifths of the distance across the hearth, combustion should be complete near the middle, which involves quick flame development and a maximum loss in temperature of gases to the bath on the outgoing end which results in the highest mean temperature over the bath. Heat transfer is the result of temperature difference, so it is of greatest importance to keep the difference as great as possible. Depending on the type of steel being made, it may be desirable to lengthen the flame somewhat during some stages of the heat; this may be controlled by the air-fuel ratio.

In general the flame should conform to the area of the bath so far as possible without impinging on the brickwork of the sidewalls. This factor is conducive to uniform heat transfer throughout the area of the bath.

It is desirable to hold the depth of the flame to a maximum of about 2½ ft. This factor promotes flame development and limits flame impingement on the roof.

A considerable amount of heat (at least 3000 B.t.u., per sq. ft. per hr.) is lost through the sidewalls and roofs. By insulating with a high melting point material, this loss can be cut in half with no appreciable damage to the brickwork.

Heat losses through the average bottom amount to approximately 1100 B.t.u. per sq. ft. per hr. and may be cut in half by proper bottom insulation. Many operators question the advisability of increasing bottom resistance to heat flow by insulation because of the danger of increased bottom trouble and break-outs. This danger is minimized by hotter flame temperature in burning in bottoms, permitting the use of less cinder, by making thicker bottoms and by the ability to renew bottoms oftener due to the savings in fuel.

Velocities in the Hearth

It has been advocated that low velocities over the bath will cause greater heat transfer. This is not true. Velocities should be regarded as an effect rather than a cause. Low velocities in the hearth should result from lower fuel input and less weight of air for combustion, resulting from the things accomplished to give higher mean flame temperatures and not from an arbitrary slowing down of the gases by increasing the cross section area of the hearth chamber. High heat transfer rates result from high differential temperatures and not from reducing velocities. If we wish to consider completeness of heat removal from the gases down to near bath temperatures, then low velocities are important. However, to increase heat transfer rates the temperature differential is the important factor.

The results of low gas velocity in the hearth are less erosion of brickwork, less carry-over of slag and flue dust and lower outgoing gas temperature but not higher rates of heat transfer.

Bath Size Area and Depth

To allow the out-going gas temperature to be sufficiently low to prevent excessive burning out of the outgoing end and have sufficient width of bath to accommodate the flame and to maintain the correct temperature locations to give the highest mean temperature across the bath, the hearth should be approximately three times as long as its width.

Heat transferred to the surface of the bath reaches the bottom much faster on shallow baths than on deep baths and consequently will boil much quicker than a deep bath. This boil brings up colder material from the bottom and this increases heat transfer due to increased temperature differentials and increased flame impingement on the boil.

Therefore, large area shallow baths are conducive to more rapid heat transfer. Probably areas of 5 to 6 sq. ft. per ton, giving depths of bath of 24 in. to 30 in., lend themselves most effectively to rapid heat transfer. The disadvantage is increased bottom troubles.

Characteristics of the Flame

If the maximum temperature position is developed slightly before the middle of the hearth is reached, the temperature gradient of the flame will correspond closely to the depth gradient of the bath and the highest possible mean temperature will be held. The location of maximum and minimum flame temperature positions is very important.

Ports should be designed to give the highest temperature on the bottom of the flame so that the maximum transfer will result from flame impingement.

Turbulence, as already mentioned, is important both from the standpoint of the mixing fuel and air for development of flame temperatures and that of its rubbing action on the bath to promote heat transfer. However, flame impingement should be restricted to the bath only. Flame impingement on the apron in front of the port during flame development prevents air from mixing properly on the under side of the flame, thus actually retarding flame development on the under side where temperature is of material importance. These factors may be regulated in the design and somewhat controlled during operation.

Consideration must be given to the area of contact of the flame with the bath because with non-luminous flames a great portion of the heat transfer is by conduction. For this reason when using short hot flames, they should make contact with the bath as soon as possible and hug it like a blanket. In order not to interfere with combustion, however, the flame should be highly developed before this contact is made. During the under cover stage, when transfer of heat is most difficult, it may be necessary to length-

en the flame materially in order to increase the area of this contact.

Characteristics of the Bath

A real test of the capacity of a furnace to transfer heat comes when all of the lime is on top of the bath as a refractory blanket. If the metal will take ore readily, remain hot and keep a good action, it has good heat transfer power.

Methods of charging affect uniform melting. If the furnace is not charged heaviest at the points of maximum flame temperature and heat transfer, these points will be melted and have the lime up and the flame must then be reduced, with a retarding of the heat transfer to the other sections of the bath where the metal is still unmelted. This is true of both the metal charge and the lime charge. To gain the maximum efficiency in heat transfer, each section of the bath should melt and pull lime at the same uniform rate.

The meltdown stage is the period of greatest heat transfer for, although the furnace is relatively cool, the charge is cold and there exists a high temperature differential between the flame and the charge. It is very difficult to melt brickwork at this stage except by direct flame impingement, because the charge is absorbing heat very rapidly. It is at this stage that high flame temperatures are very important and poor furnaces develop the temperatures necessary very slowly.

The under cover stage: After a charge has melted down level, with no bumps sticking above the molten bath, it is said to be "under cover." If the proper amount of heat transfer is taking place, the heat will continue to boil on the cold unmelted metal underneath; if not, it will lie relatively dead, and simmer and foam. A bath that will not boil, which fact shows a lack of heat transfer from the flame, is quite difficult to penetrate with heat and consequently extreme lengths of time are required to finish the melting and lime boiling operation.

However, with high heat transfer, the bath will start to boil befor it goes under cover and continue to boil violently until all of the lime is up. The boil itself accelerates heat transfer, as the cold metal from below is being thrown up into the flame, with favorable flame impingement conditions and further heat penetration into the bath and more boiling. Open hearths are like that; bad conditions tend to pyramid into worse ones and good conditions tend to pyramid into better ones.

It is in the under cover stage of the heat that long luminous flames are most effective. Heats that lie dead in the furnace even under a very high temperature non-luminous flame are brought to a strong boil very quickly by introducing a luminous flame. Performances of this sort tend to prove the doubted theory that the largest portion of the heat transferred to the open-heart bath is by radiation.

The melted stage: After a heat is melted and the lime is all up, it is difficult to drive heat into the bath, which is flat, dead and covered with lime. It is now necessary to feed ore to reduce the carbon and heat is required to reduce it. At this point if heat is not being transferred rapidly the bath will boil on the ore awhile, then stop. However, if heat is being transferred rapidly the bath will continue to boil vigorously until the ore is reduced, then continue to open up and bubble. If heat is being transferred properly, the metal will stay hot enough to permit feed after feed of ore in rapid succession until the proper carbon content has been reached.

Bath characteristics change greatly with different types of steel being made. The high carbons are very easy to hold hot. With soft steels having a declining carbon and manganese content, and increased melting point, it becomes increasingly more difficult to penetrate the bath with heat. This is due to the action on the bath becoming less and due to the radiating effect of the bath itself. The supreme test of heat transfer comes in the production of ingot iron in the later stage of the process, where, with a manganese content of under 0.050 per cent, it is necessary to hold the metal hot, pull lime and feed ore all at the same time. If, under these conditions, the heat does not freeze up or the furnace is not severely burned, there is ample reason to believe that the furnace has capacity to properly transfer sufficient heat to the bath in all stages.

THESE light alloy baby baskets weight only 7¾ pounds each, complete with name plates and safety pin holders, which is a real advantage, according to the nurses at the Los Angeles County Hospital who carry them around all day. The aluminum bassinets are safer, possessing no sharp corners for baby to bump his head on, and no open sections for him to shove his tiny fists and feet through. Smooth sides and rounded edges make them easy to keep clean and sanitary. The bassinet cart also is designed along efficiency lines, being constructed chiefly of aluminum tubing.

Luminous Flame Forging with Gas

By J. B. NEALEY
American Gas Association

THE variety of forms of burners that are in use by the Pittsburgh Forgings Co. for heating steel with gas fuel without forming scale is described in the accompanying article.

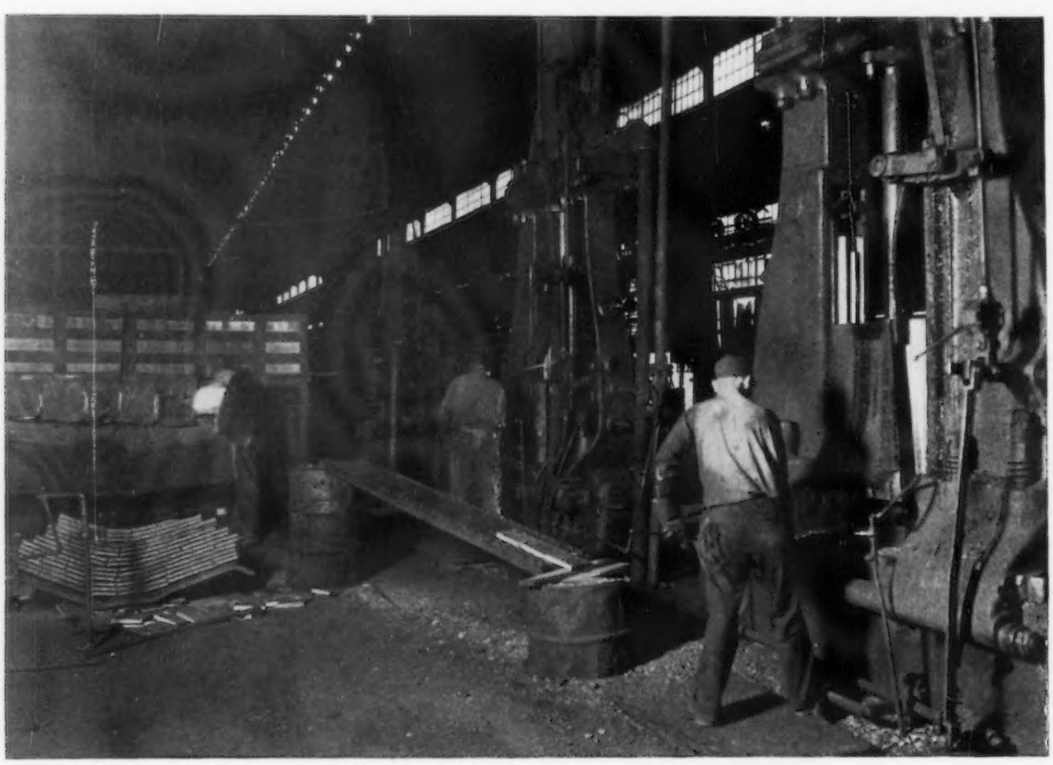
SCALE, the bugbear of the forger, has practically been eliminated during the heating process by reviving the "smoky" fuel after many years of so-called "obsolescence." Forges equipped with luminous radiant flame burners will not only bring the steel up to temperature (2300 to 2400 deg. F.) without producing scale but they will do this at high speed.

Rapid heating is attained because the flame radiates the heat, the fastest known method of heat transfer. The effective range of the flame is the entire length of the furnace, because its length can be definitely controlled. Its non-scaling characteristic is derived partly from the fact that no excess air is used in combustion and the work is protected from all atmosphere containing oxygen.

This method of heating has been adopted and is now used by the Pittsburgh Forgings Co. at Coraopolis, Pa., which, in addition to conducting a general forging practice, also makes railroad forgings, chassis forgings, and heavy pipe fittings. The main plant is housed in a building 1000 ft. long served with three overhead cranes on a long runway which extends several hundred feet beyond one end into the raw material yard. A spur railroad track runs under the craneway in this yard.

Equipment includes 20 odd power hammers ranging from 800 to 12,000 lb., nine upsetters from 2 in. to 6 in., etc., with 45 gas-fired furnaces for heating the stock. The inspection and engineering divisions are in an adjoining building, which includes a tool, jig and die shop.

Each service in the main plant, such as gas fuel, lubricating oil, steam and air, has its own pipe line in the form of a loop laid completely around the building on the inside. The steam line (12 in.) and the gas fuel line (4 in.) are hung on the columns of the building, 14 in. and 8 in. respectively, above the floor. The other two lines (4 in. each) are located in a steel plate covered trench below the floor level. The gas fuel line is fed from both ends and there is a valved take-off for each furnace. The board hammers are arranged in



A portable roller conveyor delivers heated pieces to the hammer operator.

One of the slot-type gas-fired furnaces serving an upsetter.

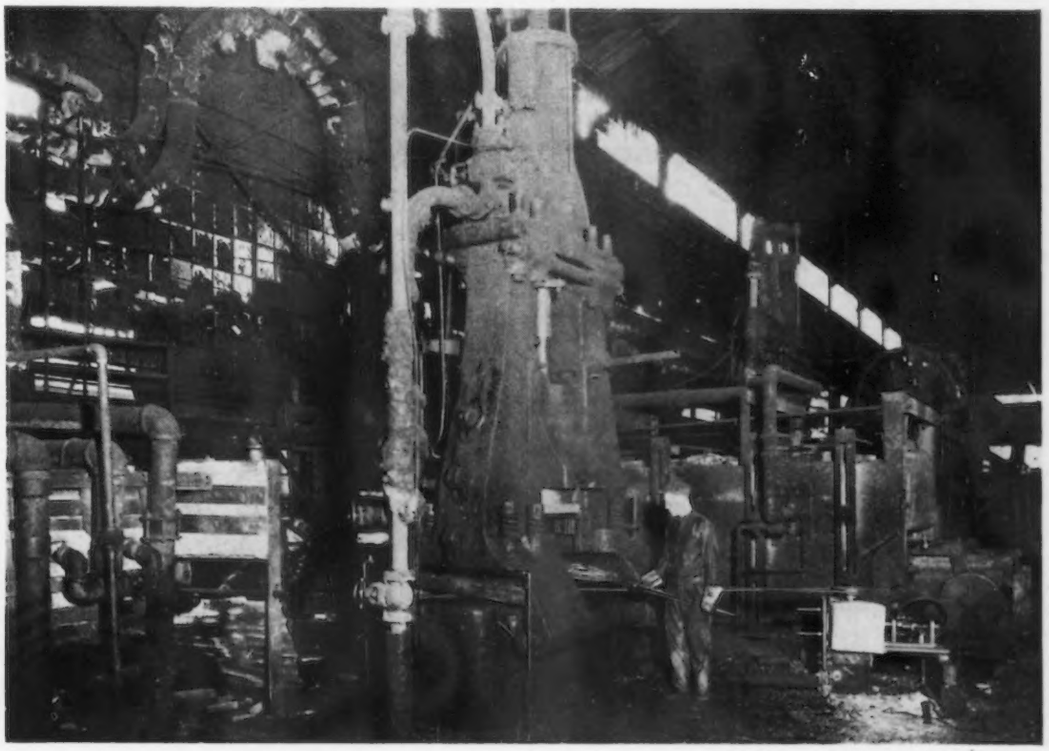
three separate groups with a motor for each group.

Automobile hub and gear blanks are made with a single blow in upsetters served with furnaces 7 x 7 ft. and 2 ft. high. Of the usual brick and steel construction, these furnaces are heated with four luminous flame burners, each consisting of a 1½-in. gas pipe within a 5-in. air pipe. This provides a circular stream of air with a gas core which shoots a flame the entire length of the furnace. The 5-in. pipe makes a right angle turn a few inches from the outside wall of the furnace and the smaller pipe extends straight through this angle. The amount of primary air intake is regulated at this point by a shutter.

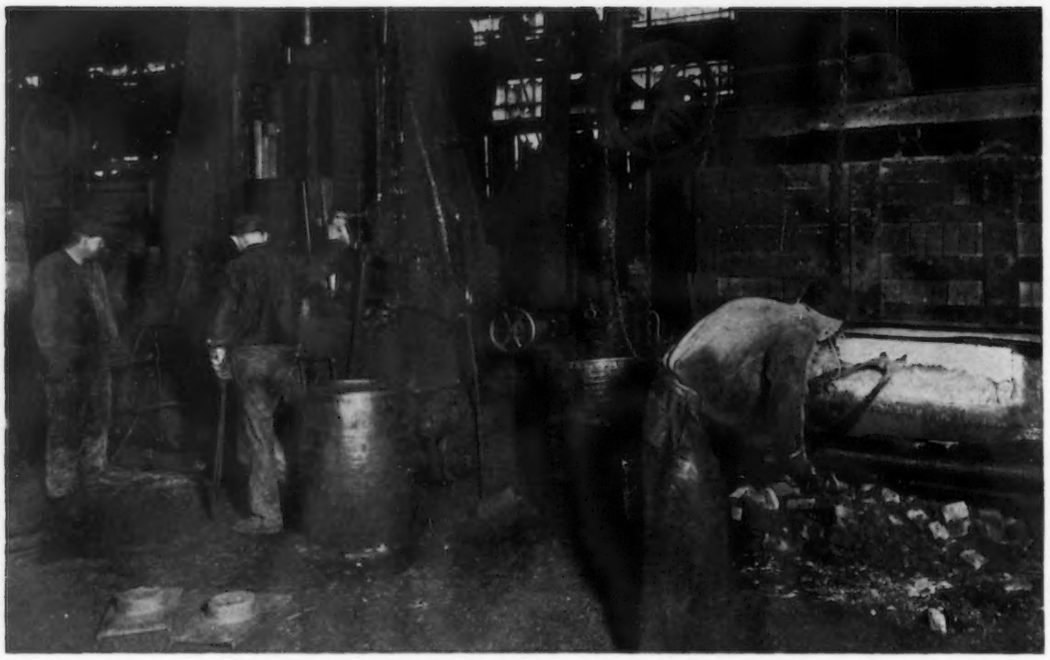
Slot type furnaces of another group are fired from the bottom, the flame impinging on the bottom side of a tile hearth. These furnaces are 7 ft. long and 2½ ft. wide and have six gas burners. The tile hearth sets on piers and the burners fire up between these piers, the heat rising against and around the hearth. This combines heat transfer both by incandescence and convection.

Forging furnaces of the continuous type and using hydraulic pushers are also fired with luminous gas flame burners. These furnaces are 20 ft. long, 6 ft. wide and 5 ft. high, and are provided with doors for side discharge. A portion of the furnace at the discharge end is higher than the rest of the furnace and the burners (three each) are located in the wall between the roofs of these two sections. The flames and heat from the burners strike the end wall and are reflected back along the hearth towards the charging end of the furnace. Thus direct flame impingement on the work is combined with utilization of the waste heat, on the counterflow principle, for preheating the cold incoming work.

The luminous flame in this case is



An end-fired slot-type furnace is at the left and a continuous pusher type is at the right.

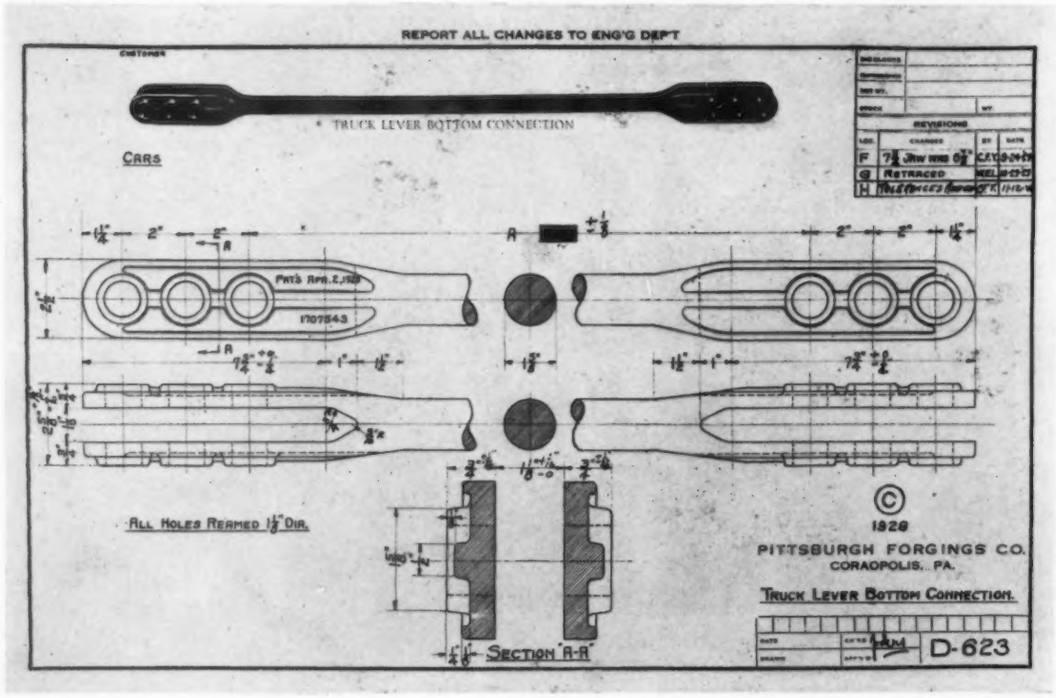


To aid in removing relatively heavy work from the furnace, the tongs are suspended by a chain.

obtained by a gas enriched mixture. The burner consists of a mixing chamber and a nozzle, and the mixing chamber is composed of two hollow castings, one outside the other. Small perforated pipes cross the large center opening through the inner casting, the ends terminating in its wall so that the gas will pass into the pipes and out through the perforations. Each end of the mixing chamber terminates in a neck, the burner nozzle being bolted to one and the air flue to the other. Gas enters the burner by way of the outer hollow ring casting while the air from a blower is forced through the mixing chamber. A damper is provided in the air duct by which the gas-air ratio is regulated. The hot work is discharged from the furnace upon a roller conveyor leading directly to the hammer.

There are some slot type furnaces that are fired with "diffusion" flame burners, which afford a blanket of unburned gas around the steel being heated to prevent contact with oxygen. These furnaces are each 9 ft. long and 2½ ft. wide and are fired with a single gas burner in one end. This burner is made of a series of small tubes protruding through one end plate of an air box into a combustion throat opening directly into the furnace. This end plate is also perforated with multiple ports through which air is forced into the same combustion throat. This provides multiple and parallel streams of gas and air which burn with a luminous flame. At the hearth line is a series of gas tubes without the air ports so that gas alone is projected

(*Concluded on Page 74*)



Freight car truck lever connector as made by the Pittsburgh Forgings Co.

Administration; a Forgotten Function

By E. BELKNAP
Vice-President, Industrial Administration

ADMINISTRATION, in industrial control, has been lying down on the job. During the boom times it was largely a forgotten function, having surrendered its responsibilities to management.

This, believes Mr. Belknap, is one large reason why so many concerns have gotten into hot financial water followed by a long-term immersion in red ink. An instructive concrete example of capital expansion under no control and under administrative control is given to illustrate his thesis.

WE are facing a new era of social and economic relationship. Readjustment is imperative. The Government is endeavoring to aid the recovery of business. Business for its part is giving a large amount of coordinated effort to the same end. The change from the old to the new scheme of things has progressed so rapidly that it has been almost impossible for executives to keep pace with the numerous problems which have suddenly confronted them. These changes with their attendant individual problems are so important and are so far reaching in their effects on present and future activities that they cannot be ignored. As it is desired to arrive at a fundamental basis for the solution of an important majority of industrial problems, it is believed advisable to consider a means of establishing *organization* and *adaptability*.

Over a period of years many ideas have been advanced, but their lack of success in a practical application has been due to the fact that while in some parts the formulae themselves may have been correct, these same formulae were not started with or based upon the fundamental underlying principles of effective and efficient organized functioning. Therefore, let us consider the heart of any organization—*operation*, *management*, and *administration* — the group which provides the stamina for efficient organization.

In all industrial undertakings, large or small, simple or complex, the structure of any concern may be divided into three separate and distinct main groups classified as operation, management, and administration. Operation is, of course, that basic part of the industrial structure which is performed by the group loosely called labor—the manual and mechanical work involved in manufacturing and distributing goods. Management and administration jointly include all the tasks comprising business control.

There is, however, a vital distinction which corresponds to a fundamental difference in human make-up. Management may be described as the actual task of control, the employment and the putting to work of all the available means—human and mechanical—by which the ultimate objects of the business are to be achieved.

What Is Administration?

Administration is the function which determines what the objects of the business are, which keeps management constantly striving toward those ends, and which fits together the various branches of management so that each contributes, effectively and harmoniously, its full quota. In short, administration is the process of determining policy; of coordinating finance, production, and distribution; of settling the compass, form and structure of the organization, and of exercising the ultimate control of the management. The work of administration, therefore, as defined above, may be summarized as *direction*, *organization*, and *coordination*.

Let us keep well in mind the distinctions between administration and management. Then we find that during the years of abnormal expansion which preceded the present period of readjustment, the function of administration was generally delegated to or else assumed by management. As a matter of fact, it was almost entirely lost sight of. This was particularly true where finances were controlled by management. The consequent waste, invisible and extremely large, was attributable to misdirected and misplaced energy. It was primarily responsible for the dissipation of capital, and this situation is now making it difficult for many enterprises to survive unassisted in the process of elimination by which the surplus plant capacity in all branches of industry is being steadily adjusted to a profitable operating basis.

It might be well to call attention at this point to the fact that improper understanding of administrative activities and coordination has been detrimental and administrative control has been little more than elementary and based almost exclusively upon intuition and antiquated formulae.

More Responsibility for Administration

In the era of better business inevitably following the rehabilitation of industry, administration will assume the added responsibility of directing and coordinating the activities of management. On the other hand if administration is not allowed to take its proper field of action and perform its proper functions, business may fall into the errors of its old ways.

At the same time, administration must take upon itself to not merely be acquainted with the problems of production and distribution, but to have a complete knowledge and practical understanding of these problems. It must more accurately interpret the trends of supply and demand, and must employ the most practical and dependable mechanisms with which to maintain effective control.

It is now necessary to turn to the means by which its activities are to be carried on in the most practical and effective manner. Work along this line has been established with a background of experience and the intelligent application of correct principles. Intensive research over a

long period of years, both in domestic and foreign fields, in diversified industries, and from a viewpoint unique and original, has developed a comprehensive solution to the problems confronting industry today. As a result of this study, the fallacies of the methods used for determining costs and the formulae used for establishing price levels have been revealed and overcome. Profiting from the research and study mentioned, a method has been provided which not only indicates the rate of expansion in different branches of industry which will not overabsorb in book debts and inventories the capital created by operations, but also the amount of capital debt which may be supported at various levels of turnover.

Conceding that the instruments of control are present in any method and having outlined herein the distinctions of operating functions, it now becomes essential to consider the directing force. This is classified as the administrator who is the focal point of industrial activity, and as such, should be given the full advantage of scientific control to more efficiently function. The administrator dealing with such elusive factors as capital creation and absorption, inventory turnover, capital turnover, sales, policies, and finances, has had only the doubtful aid of overall costs and such information as general accountancy has been able to give him. He cannot perform his function to full advantage if governed by impressions of conditions, an occasional operating statement, and intuition. Therefore, by eliminating the occa-

sional operating statement, and the factor of intuition and replacing it with complete administrative control, it is possible to show from month to month, to a very fine degree of accuracy and practicability, the trend of the business. It will also show those places where effort can be expended to the greatest advantage, and compare the working condition of the organization with predetermined objectives which are designed to maintain sales, production, and fiscal balance.

A Specific Example

Now let us see an application. The matter of capital creation and absorption is one which is in general but vaguely understood. We often find firms expanding rapidly with the intention of increasing profits by a greater spread of burden and overhead which do not increase in the same proportion as sales, and doing it in comparative ignorance of whether or not the nature of the product and the consequent margin will warrant such a policy without detrimental effects on the fiscal structure. By the word "margin" we mean the percentage difference between sales income and direct producing costs. A low margin and a high ratio of material to productive labor would make such a move disastrous or at least extremely embarrassing as shown by the following example of a typical expansion. This is aside from all capital expenditure in machinery and equipment which would further accentuate a deficit in working capital.

In this example, the figures are nearly self explanatory. Productive labor and manufacturing material, which compose the direct cost of sales, and therefore bear a fixed or nearly fixed relation to sales, increase in direct proportion to the sales, burden and overhead, we have assumed to increase at 60 per cent the rate of sales increase. Inventories have been assumed to turn over at two times per year for material and ten times per year for labor. Book debts are taken at 10 per cent of yearly sales, which represents an average collection period of 37 days. These figures would represent a majority of enterprises running under almost ideal conditions.

In this illustration, it will be seen that under the columns headed "non-controlled method," the company has attained its objective of increased profits, but unless it is a corporation which, on the basis of this performance, can acquire additional funds, the capital deficit will prove a great obstacle. The independent manufacturer must expand at a rate commensurate with his ability to release the necessary capital from operations. In the column "controlled method," the company has created a surplus with which to pay dividends or other obligations and does not have to acquire additional funds.

EXAMPLE OF NON-CONTROLLED AND CONTROLLED CAPITAL EXPANSION

	NON-CONTROLLED		CONTROLLED
CAPITAL CREATED	NORMAL	EXPANDED	EXPANDED
Net sales	$500,000	$1,000,000	$1,000,000
Productive labor ....15 per cent	75,000	15 per cent 150,000	11¼ per cent 112,500
Manufacturing material ...55 per cent	275,000	55 per cent 550,000	50 per cent 500,000
Margin ....30 per cent	$150,000	30 per cent $300,000	38¾ per cent $387,500
Production burden—			
Non-productive labor	$30,000	$50,000	$37,500
Supplies and expense....	30,000	50,000	42,500
Fixed charges	15,000	20,000	20,000
Sales and distribution.....	25,000	50,000	50,000
Administrative overhead ...	25,000	30,000	30,000
Operating profit	$25,000	$100,000	$207,500
Income tax	3,125	12,500	25,937
Net profit (capital created)	$21,875	$87,500	$181,563
CAPITAL ABSORBED			
Book debts ..... 10 per cent of sales	$50,000	$100,000	$100,000
Labor inventory ..... 10 per cent of labor cost	7,500	15,000	11,250
Material inventory ..... 50 per cent of material cost	137,500	275,000	250,000
Total absorption	$195,000	$390,000	$361,250
Previously absorbed		195,000	195,000
Additional absorption		$195,000	$166,250
Capital created		87,500	181,563
Surplus of capital.....		(Deficit) $107,500	(Surplus) $15,313

France and U. S. Will Exchange Foundry Ideas

WASHINGTON, March 20.—C. M. Saeger, chief of the experimental foundry, Bureau of Standards, has just been requested to prepare a paper on foundry development in keeping with a custom of several years' standing, by which ideas are exchanged once a year between the foundrymen's technical association of France and of the United States.

These "exchange" papers are presented to the foundry industry in each country through the technical associations.

The paper being prepared by Mr. Saeger will concern work which has been in progress for some time on the properties of standard copper—base ingot metals and the attempt to replace the multitudinous commercial compositions which often differ only in minor respects by a chosen set of compositions, the basic properties of which have been thoroughly studied.

New Things in Materials and Processes

By EDWIN F. CONE

More About Beryllium-Copper

NEW developments in the manufacture and uses of beryllium-copper alloys continue to come to light.

One company has found it possible to cold work one of these alloys, containing about 2.25 per cent beryllium, so that they can produce in wrought form various types of tools. In certain parts of the process, some heat treatment is necessary but production by the cold wrought process has reached the commercial stage.

Another company has recently successfully rolled one of these alloys to a thinness of 0.002 in. in strip form and on a Steckel mill. This product is said to be available for diaphragms, competing with other metals.

An interesting application of one of these alloys is for electric contact material. In a very delicate and complicated mechanism, small wheels of beryllium-copper are used to make and break the electrical contact with tungsten-tipped points. It is said that the new material gives better satisfaction than that which was formerly being used. The small wheels are machined from bars of beryllium-copper alloy.

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Welded Steel to Operate at Low Temperatures

THERE have been some striking developments in the application of steels to the oil industry, particularly where low as well as high temperatures are concerned. A large producer of welded cylinders is furnishing certain oil refining plants with steel cylinders which must operate at —50 deg. F. The specifications call, among other things, for a Charpy value of 15 ft.-lb. at this low temperature.

It is stated that there has been no difficulty in meeting this and other physical properties both in the main part of the cylinder metal itself and in the welded portions. This 15 ft.-lb. value is regarded as a large factor of safety, but it is stipulated. The cylinders are used at the low temperature for separating paraffin from the oils by congealing.

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Tantalum in Stainless Steels

WILL tantalum play a role in the stabilization of the stainless steels? Some interesting facts concerning this came out in the discussion of the paper by F. M. Becket and Russell Franks of the Union Carbide & Carbon Research Laboratories at the annual meeting of the American Institute of Mining & Metallurgical Engineers, in New York.

The paper dealt with the use of columbium in the nickel-chromium types of steels and the demonstrated efficacy of that element as a stabilizer or preventive of intergranular precipitation. Because tantalum is closely allied in its properties to columbium and because it is associated with this element in the ores containing columbium, the question was raised whether any work had been done on the effect of tantalum as an alloy in the stainless steels.

It was brought out that ferrocolumbium, as made from columbium-bearing ore, contains appreciable quantities of tantalum. Depending on the carbon content of the alloy steels, the tantalum content can range from 2.50 to 4 per cent. It was stated that its presence in these steels has an influence quite like that of columbium or titanium. Advocacy of tantalum as an alloy in place of columbium or titanium has not reached serious consideration, though its possibilities are recognized. There are other factors to be taken into account in considering it as a commercial alloy.

In connection with this whole subject, some light was also thrown on the problem as to whether enough columbium in the form of ferrocolumbium is available. There has been some doubt as to the quantity obtainable. The statement was made that enough columbium can be safely assured to industry.

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"Streamlined Fittings" of Stainless Steel

"STREAMLINING" is not confined to trains, automobiles and so on. One of the enterprising electric steel foundries of the country is producing what it has named streamlined fittings of stainless steel. The writer has been shown a sample of a T-fitting of unusually small wall thickness and size—about ⅛ in. thick and no more than 3 in. long. To cast thin wall sections successfully from stainless steel is by no means easy.

The designation "streamline" arises from the fact that no threads are cut in the three openings—they are machined out to the depth of about a ½ in. so as to leave a shoulder the thickness of the pipe or tubing which is to be joined to the fitting. There is thus no obstruction to interfere with the ready flow of liquid through the fitting. Firm joining of the fitting to the tube or pipe is accomplished in a novel manner. Some type of solder is poured through drilled holes where the tubing or pipe enters which results in fixing the joint by capillary action.

Brass fittings of the same type are also being made by a Western foundry.

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Metals Used in Gyroscopes

IT has been a suprise to the writer to learn, from intimate contact, the extent to which metals play a vital role in the successful operation of gyroscopic instruments. This fact was suspected and led to a study of the application of metals to the products of the Sperry Gyroscope Co., Brooklyn.

It is highly important that the gyroscopic rotors or revolving wheels, which vary widely in size and composition, shall be uniform in density and composition. Some of them are forgings and some are castings, and may be of steel, iron or non-ferrous material. The rotors must revolve without vibration or breakage at a speed as high, in some cases, as 12,000 r.p.m. Highly refined forging and casting methods are used. It will be possible later to describe the methods and materials in detail.

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Extruded Forgings

EXTRUDED forgings is a term which is not commonly known. Such products in various forms are being produced on a large scale by one leading steel company and in smaller volume by a few others. The

large producer referred to is making these forgings for industrial applications in about eight different industries.

The method of manufacture consists in piercing, drawing or extruding in a die hot billets or slugs, to force the excess metal out at one portion of the die. The products thus made are then subjected to various processing methods including heat treatment and machining. A variety of interesting articles is being made and the industry has grown to sizable proportions.

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Cause of Hardening by Nitriding Demonstrated

FOR some time there have been theories as to the actual reactions which take place during the hardening of special alloy steels by the nitriding process. It has been assumed that certain nitrides are formed which give rise to the hardened surface. At least the first demonstration of what actually takes place in the nitralloy steels containing aluminum was made public at the February meeting in New York of the iron and steel division of the American Institute of Mining and Metallurgical Engineers in a paper by John Norton of the Massachusetts Institute of Technology.

Professor Norton discussed the results of a series of X-ray researches. He showed by several groups of X-ray pictures taken of steels containing varying percentages of aluminum that aluminum and iron nitrides are the actual cause of the surface hardening following the heating in an atmosphere of ammonia at prescribed temperatures. The iron nitride does not play an important role. The X-ray pictures, taken before and after nitriding, reveal the changes in the bands which the nitride of aluminum causes.

The author does not discuss any other steel for nitriding which does not contain aluminum but which is a nitralloy. One of these is a chrome-vanadium steel of special composition for that purpose. It is claimed that the vanadium acts in a manner similar to aluminum.

Fatigue Characteristics

THE operating range of commercial springs is extremely great, as illustrated by heavy railroad units weighing well over ¼ ton, compared with the smallest of wire springs which may aggregate 40,000 to a pound. In all this range the units are required to fulfill definite severe operating conditions in a reliable manner and over an extended period of time. The accompanying data are concerned with the proper evaluation of commercial springs, and is the concluding portion of an article which appeared last week. It is shown that a high fatigue limit as determined on polished specimens is not a sole criterion of spring life, and, in addition, the author demonstrates the inefficiency of the best alloy spring steels when compared with beryllium bronze. The conclusion indicates that present commercial springs can and should be improved.

THE investigation of commercial springs, which was described last week, included composition designated by producers as chrome-vanadium, electric carbon, acid open-hearth carbon, and silico-manganese steels, and beryllium bronze. The stress and fatigue curves for these materials were also published.

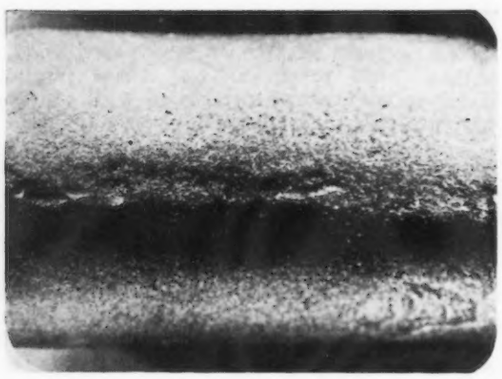
A study of the microstructures of the steels showed that they were reasonably free from inclusions. The electric carbon and chrome-vanadium steels were somewhat cleaner than the acid open-hearth and silico-manganese steels, as shown by unetched photomicrographs. In general, there was no decarburization in any of the springs.

The grain structures of the alloy steels were fine and uniform in size, although there was slight banding in the case of silico-manganese. The grain structure of the carbon steel was coarser, especially the acid open-hearth, which probably resulted from the high temperature used for coiling. As shown in Fig. 5, there was a considerable quantity of free ferrite in the electric carbon steel, with some lamellar and spherodized pearlite and sorbite, and the grain size at the surface was somewhat finer than at the center. The acid open-hearth carbon steel was martensitic in character with some evidence of retained austenite, and the lower fatigue resistance of this steel as compared to the electric furnace steel may have been due to the martensitic structure, which according to some investigators has a low fatigue resistance.[3] Use of the McQuaid-Ehn test indicated that the acid open-hearth carbon steel was normal, whereas the electric carbon steel was slightly abnormal.

The microstructure of beryllium bronze showing twinning and slip bands is shown in Fig. 5. This structure is typical of the alloy after solution treatment, cold work, and hardening by aging at 525 deg. F.

A study of mechanical properties, especially tensile and torsional characteristics, is essential for obtaining the load-deflection characteristics

[3] Fatigue and the Hardening of Steels. H. S. French. Transactions A.S.S.T., October, 1933, page 915.



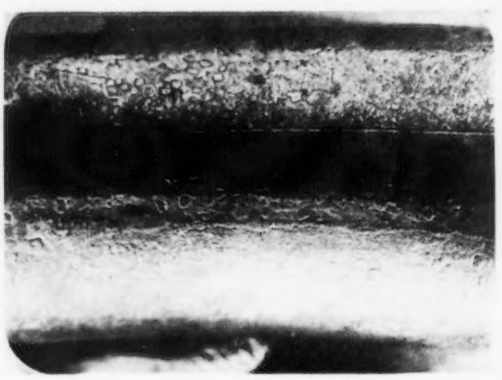


Fig. 6—Photographs at 2 diameters of the inside surfaces of electric steel springs showing shallow depressions. When hot-coiled (left) the depressions are deeper than in the case of cold-coiled (right) springs.

# of Helical Springs

By J. B. JOHNSON
Chief of Materials Branch, U. S. Air Corps, Wright Field, Dayton, Ohio

of spring materials. It is desirable to have a high ratio of yield strength to ultimate strength, and alloy steels have a decided advantage in this respect. The static properties, however, bear no direct relationship to the fatigue properties of the coiled spring.

Effect of Burnishing Was Negligible

The results of the fatigue tests on the springs and spring materials are shown in the stress-cycle graphs, Figs. 2 to 4 of THE IRON AGE, of March 15. The same symbols are used in all of the diagrams. The stresses in the springs which took a permanent set below 5000 cycles were calculated on the basis of the shortened spring. The cold-coiled electric carbon steel springs gave the longest life in the fatigue tests, and the effect of burnishing was found to be negligible, therefore no distinction was made in plotting the values for the burnished and unburnished units. The springs A and B, which were run close to their fatigue limits for more than a million cycles, were retested at higher stresses and failed at the number of cycles designated by the crosses on the graphs. Their life was found to be equal to virgin springs tested at the same stresses, which indicate that there was no damage due to understressing.

Use of the Magnaflux test resulted in the detection of a few small longitudinal seams in some of the unground alloy steel springs, although these seams had no appreciable effect on the spring life. When located on the inside of the coil, however, the seams formed the origin of fatigue cracks which led to complete failure. Each of the unground acid open-hearth steel springs had an average of twelve cracks, whereas all except three ground springs were entirely free from fissures. The life of the former was erratic and relatively low, demonstrated by the fact that one spring containing twelve cracks failed at the low stress of 49,000 lb. per sq. in., after 1,800,000 cycles.

Stress-cycle graphs for the springs were superimposed on the graphs for the polished specimens to facilitate the comparison of materials operating in the form of straight specimens and coiled springs. These graphs were shown last week. Assuming the calculations for the stresses in the spring to be of the same degree of accuracy as for the straight specimens, the reduction in fatigue limit which varies from 13 to 51 per cent, Table II, is probably due to the stress raisers which are present on the inner surface of the coil. The inside surfaces of the plain beryllium bronze springs compared more favorably with that of the polished specimens than in the case of the steel springs, and consequently, the graphs lie closer together. The cold-coiled springs of electric steel contained shallow depressions on the inside of the coil, although the fractures were not as

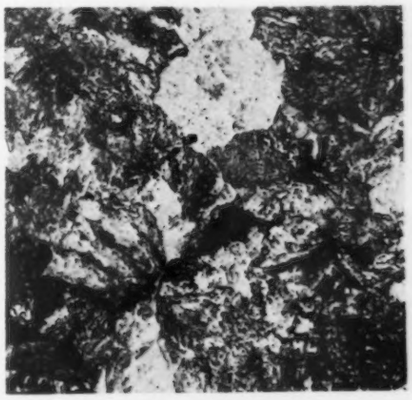
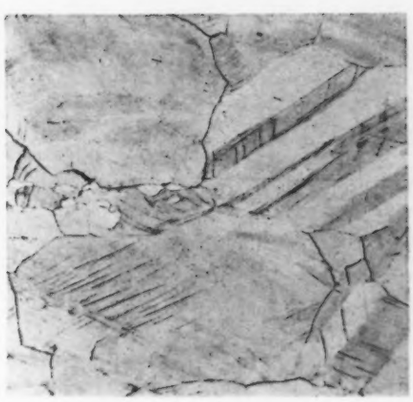
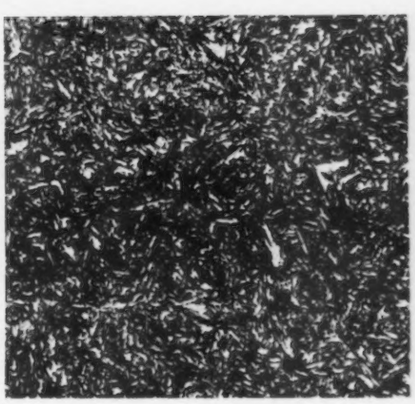


Fig. 5—Microstructures of the materials considered in this investigation. Samples are etched and photographed at 500 diameters. Beryllium bronze is shown at the lower left, silico-manganese directly below, chrome-vanadium at the lower right, acid open hearth carbon to the left, and electric carbon to the right.





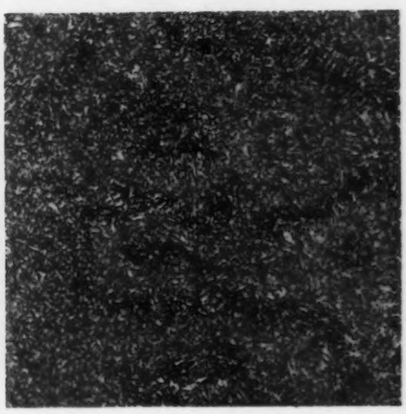


TABLE II

COMPARISON OF FATIGUE LIMITS

Type	Rotating Beam: Polished Specimens	Rotating Beam: Notched Specimens[2]	Rotating Beam: Reduction, Per Cent	Torsion (0 to Max.): Polished Specimens	Torsion (0 to Max.): Notched Specimens[2]	Torsion (0 to Max.): Reduction, Per Cent	Springs	Reduction in Per Cent, Springs vs. Polished Specimens	Spring Deflection at Fatigue Limit, Per Cent of Maximum
Acid Open-Hearth	80,000	36,000	55	102,000	80,000	22	70,000[1]	31	39
Basic Electric	98,000	48,000	51	123,000	95,000	23	93,000	24	52
Chrome-Vanadium	104,000	28,000	73	128,000	73,000	43	77,000[1]	40	40
Silico-Manganese	112,000	35,000	69	138,000	63,000	54	68,000[1]	51	35
Beryllium Bronze	30,000	16,000	47	30,000	26,000	13	26,000[1]	13	23

[1] Extrapolated. [2] Stresses calculated on diameter at bottom of notch.

deep as those in the hot-coiled springs. This difference in surface condition is shown by the photographs in Fig. 6.

Notched Specimens Preferable

A helical spring is of such a shape that the stresses are unequally distributed across the section, and there is a concentration of stress in the outer fibers of the wire at the inside of the coil. Stress raisers such as seams and depressions are, therefore, most detrimental when located along the inside surface. Fatigue data obtained on notched specimens were found to be a better criterion of the suitability of a material for helical springs than corresponding data on smooth polished specimens. The effect of a notch in a straight specimen is comparable to the effect produced by the concentration of stress on the inside of a coiled spring containing the defects normally present in a spring coiled from a wire of large diameter. The rating of the steel in regard to its sensitivity to the notch effect, both in rotating beam and torsional fatigue tests, was practically of the same order as for the finished spring. In addition, the alloy steels were more sensitive to the notch effect than the carbon steels. These observations are demonstrated by the data presented in Table II.

The results of this investigation of commercial springs are not presented as conclusive evidence of the superiority of any particular type of steel or method of fabrication. There are several experimental and operating variables which would necessarily have to be isolated in order to determine their true significance. The data given herein, demonstrate that a high fatigue limit as determined on polished specimens is not the sole criterion of spring life. An additional and essential factor is a low sensitivity to the effect of stress raisers, which are particularly patent when located on the inside surface of the spring.

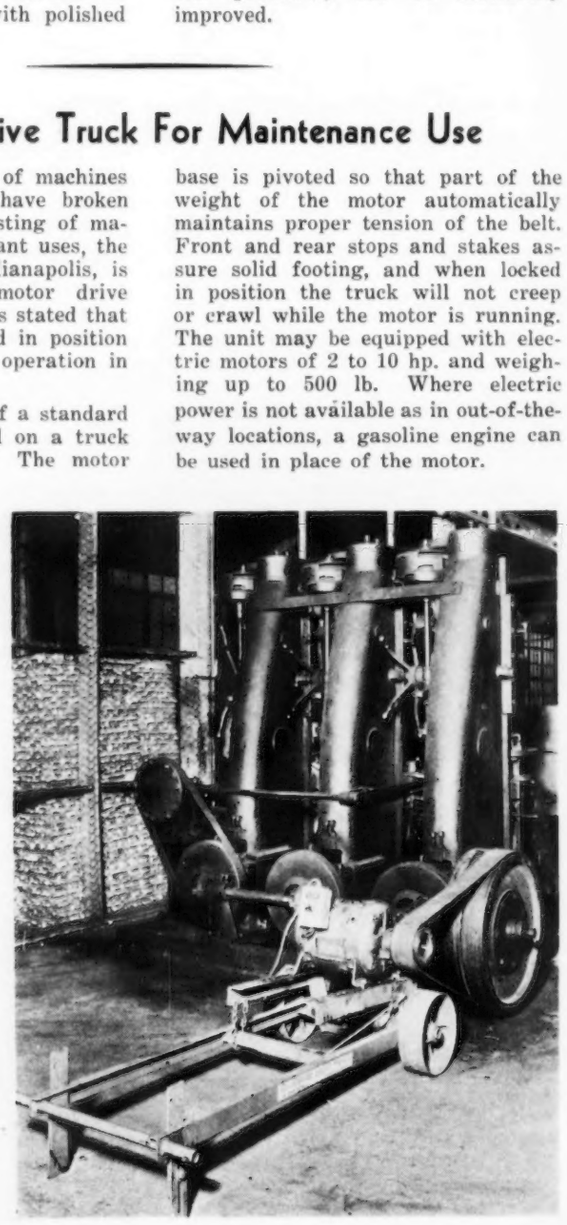
The mechanical properties of the alloy steels were, of course, quite high, but these advantages could not compensate for the reduction of fatigue resistance due to the "notch effect," when compared to a coarse grained carbon steel with low sensitivity in this respect. The experimental data showed that the material in the best steel springs were less efficient than the beryllium bronze with regard to fatigues. The latter, when coiled into springs, developed 87 per cent of the fatigue limit obtained with polished specimens, compared to 76 per cent for the electric carbon steel. The comparative fatigue limits for the other steels are shown in Table II. From the experimental data shown, it is apparent, therefore, that the efficiency of helical springs, manufactured in accordance with the best commercial practices, can be materially improved.

Portable-Drive Truck For Maintenance Use

FOR temporary driving of machines the motors of which have broken down or need repair, testing of machinery and for other plant uses, the Rockwood Mfg. Co., Indianapolis, is offering the portable motor drive truck here pictured. It is stated that the truck can be wheeled in position and the drive placed in operation in less than 5 min.

The unit is made up of a standard Rockwood drive mounted on a truck of sturdy construction. The motor base is pivoted so that part of the weight of the motor automatically maintains proper tension of the belt. Front and rear stops and stakes assure solid footing, and when locked in position the truck will not creep or crawl while the motor is running. The unit may be equipped with electric motors of 2 to 10 hp. and weighing up to 500 lb. Where electric power is not available as in out-of-the-way locations, a gasoline engine can be used in place of the motor.

Where temporary drives are made necessary because of motor breakdown or repair, the truck can be wheeled into position and the drive quickly placed in operation.



▲▲▲ LETTERS TO THE EDITOR ▲▲▲

Comments on Stevens' F. W. Taylor Test Data

IN the Feb. 8 issue of THE IRON AGE, on page 24, there was published a report of a series of tests on cutting steels conducted by Stevens' Institute of Technology with the assistance of the subcommittee on metal cutting of the American Society of Mechanical Engineers. These tests, which were in celebration of F. W. Taylor's fiftieth anniversary as a graduate from Stevens, simulated, in much abbreviated form, the tests made by Taylor in his pioneer work at Bethlehem.

The results of these tests, as compiled by the engineers in charge, which were incorporated in the article published in THE IRON AGE have aroused certain comments which are in the form of Letters to the Editor, reproduced below.

The Editor.

Editor, THE IRON AGE:

I HAVE read with interest the report of the lathe turning tests conducted under the auspices of the American Society of Mechanical Engineers at the Stevens' Institute of Technology on Dec. 7, as published on page 24 of the Feb. 8 issue of THE IRON AGE. Although I was present at this demonstration, I had not seen the results of the various tests until published in your paper.

Such tests, in which cutting tool materials of different types are compared, are of general interest, although I am of the opinion that, in drawing conclusions from tests of such a limited nature and so inconsistent, more harm than benefit might result.

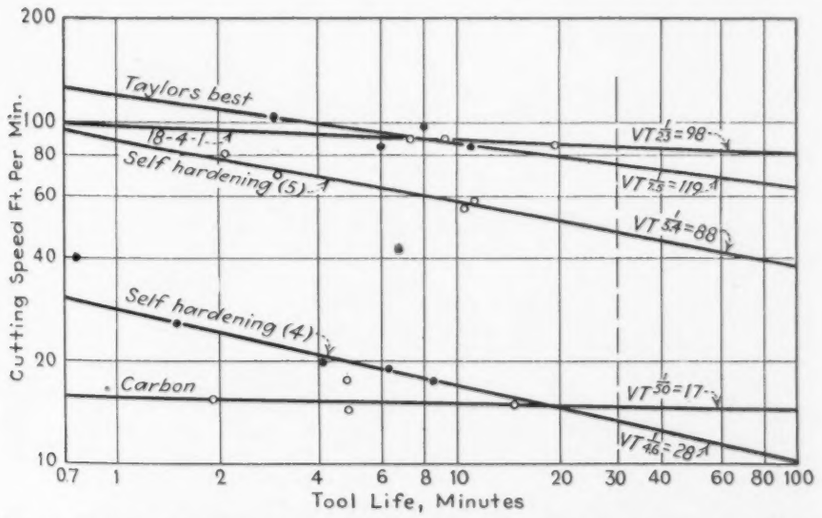
For each of the tool materials tested, a tool life in minutes was obtained for each of several cutting speeds. It has been known long that the relation between cutting speed and tool life may be represented by an equation such as VT^n=a constant. The value of n appears to be dependent upon the several variables involved in the test. It has been found by various experimenters to vary over a considerable range. In calculating the cutting speed for a 30-min. tool life, as listed for each test in Table III of the Feb. 8 article, the value of n was taken as 1/5.2 for the carbon and self-hardening tool steels and as ⅛ for Taylor's Best and modern high-speed steel. If the experimental points showing cutting speed and tool life were plotted as they are in the attached illustration, it is seen that the assumed values, on which the calculated cutting speed for a 30-min. tool life was based, are far from representing the data. This chart shows equations for the different tools to be as follows:

Carbon tool steel.....	$VT^{1/50} = 17 (14.8)$
Self-hardening tool steel, No. 4.....	$VT^{1/4.6} = 28 (13.3)$
Self-hardening steel, No. 5.....	$VT^{1/5.4} = 88 (47.0)$
Taylor's Best.....	$VT^{1/7.5} = 119 (75.0)$
18-4-1 High-speed steel	$VT^{1/23} = 98 (84.5)$

The values in the parentheses are the cutting speeds for a 30-min. tool life as taken from the curves. Inasmuch as these curves have different slopes, the relative value of the cutting speeds for another tool life would be different. The curve shows that Taylor's Best high-speed steel is equal to the 18-4-1 high-speed steel for a tool life of approximately 8 min. and is inferior for greater values of tool life. It also is seen that the self-hardening steel (4) is equivalent to carbon tool steel for a tool life of approximately 18 min. but is inferior for greater values. I believe it also is true that these values would be changed in their relative importance had a 22-deg. side-rake tool been used as recommended by Taylor instead of a 14-deg. side rake tool.

My object in presenting this discussion is only to advise caution in drawing conclusions from inadequate experimental data, as many people eager for such information would accept it at its face value without checking the computations.

O. W. BOSTON, *Director, Department of Engineering Shops, College of Engineering, University of Michigan.*



The results of the cutting tests run at the Stevens Institute of Technology illustrated graphically on log-log paper. The exponents of the tool life *T*, as indicated by the slopes of the curves, are shown to differ widely from those used to compute the cutting speed for a thirty-minute tool life as shown in Table III in the article in The Iron Age, Feb. 8, 1934, page 25.

Editor, THE IRON AGE:

It was with considerable surprise that we read the following statement in a report of the Stevens' F. W. Taylor anniversary test on cutting steels in THE IRON AGE of Feb. 8.

"The Carbon Tool Steel *which is of a grade now on the market*, is very similar to the Jessop Carbon Tool Steel, No. 85 in Folder No. 20 in 'On the Art of Cutting Metals.'"

We desire to register our emphatic protest against this statement on two counts. In the first place there are not and never have been any American carbon tool steels even remotely similar to the Jessop carbon tool steel which formed the basis of comparison in Taylor's and White's classical researches on the art of cutting metals.

In the second place, the form of the above statement is likely to lead to the impression that the Jessop carbon tool steels No. 85 in Folder No. 20 of "On the Art of Cutting Metals" is no longer on the market.

We desire to point out that we are still marketing in this country steels exactly similar to those used by F. W. Taylor in his tests.

FRED. C. A. H. LANTSBERRY, *President, William Jessop & Sons, Inc.*

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A Correction

IN Mr. Staniar's ninth article on mechanical power transmission, dealing with horizontal and vertical motorized reduction units, which appeared in The Iron Age of March 15, the revised text of the author's manuscript was not followed. Thus, under the heading "Three Types of Construction," on page 21 the phrase "and by far the best method of the three" should have been deleted. In this case, as in others where alternate designs are available, the "best method" is determined in the light of the particular conditions encountered.

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Welded Auto Loading Devices

FOR several years railroads lost a substantial amount of revenue in the transportation of finished automobiles because of the trend toward the use of so-called truckaways and the driveaway plan of delivering cars from factories to dealers. One of the chief reasons why the motor car industry turned to the newer methods of delivery was the expense involved in loading and unloading automobiles for movement by rail and the slowness of this process.

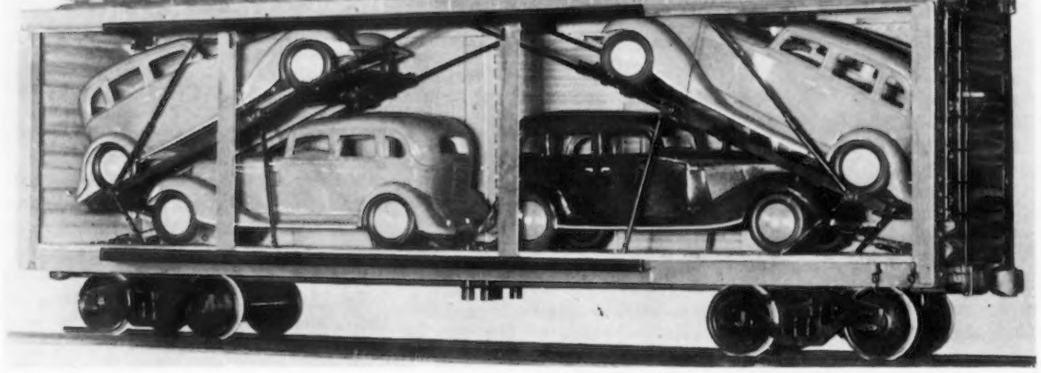
With the approval by the railroads of an all-steel auto-loader, which is a part of the permanent equipment of automobile freight cars, the steam carriers are on their way toward regaining a comfortable share of what looked like a lost market. This patented device, taking 3000 lb. of steel, makes it possible to load four automobiles into a freight car, whereas by the old system there were many instances in which only three cars could be carried. There are two devices in each freight car.

Heretofore the holding devices in freight cars for securing automobiles in place during shipment have consisted of wooden blocks nailed into the floors and made firm by the use of drive screws. When the nails and screws were withdrawn, the floor was badly damaged and had to be replaced at intervals at an average cost of $75 a year. The replacement of damaged car walls added another $10 to the annual maintenance cost. Removal of old dunnage and nails prior to reloading was a further expense amounting to $7.50 per year.

The auto-loader saves money for all parties concerned—the railroad, the automobile manufacturer and the automobile dealer. To the railroad it means a considerable increase in payload per freight car and the virtual elimination of the cost of car floor replacement. To the automobile manufacturer it means a reduction of about 75 per cent in labor cost of loading cars. It also saves him the expense of warehousing and handling other kinds of loading materials. It means to the automobile dealer the elimination of the arbitrary decking charge assessed by the automobile manufacturer and of the dunnage charge (for wooden decks and blocks), and a decline in the cost of unloading, savings estimated at $35 for a four-car load.

Sold by the Evans Products Co., Detroit, the auto-loader is applicable to practically any combination load of automobiles or trucks where decking can be used, regardless of make or model. It does not affect the general utility of the freight car, as grain or other freight can be loaded equally as well in a car equipped with it as in the ordinary car.

It consists of two box girders made



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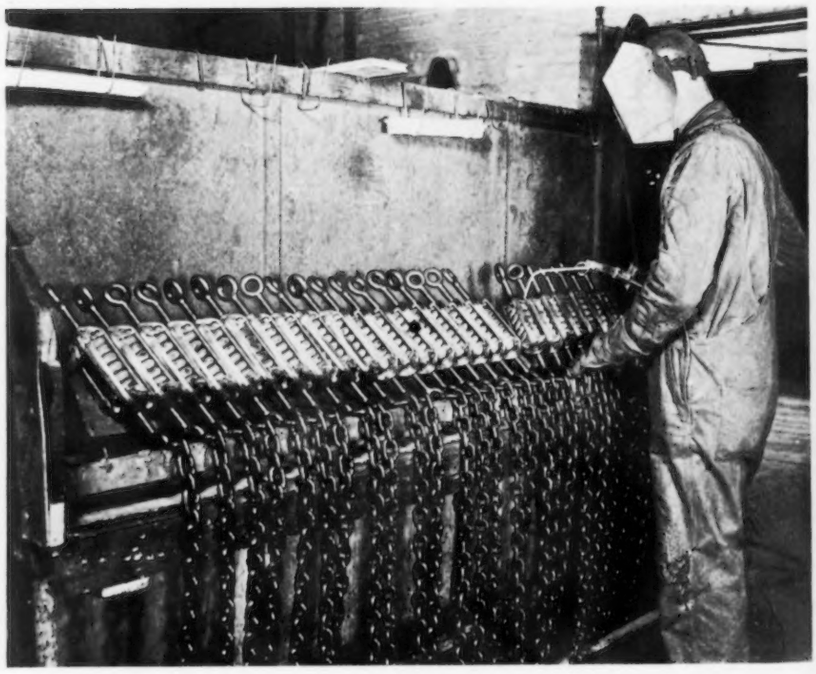
Use of the loading device makes possible shipment of four automobiles in a single railroad freight car.



The frame being welded to the spring cage chain. Units are placed next to each other so that welder can transfer welding rod instantly from one unit to adjoining one without breaking welding arc.

Reclaim Business for Railroads ▲ ▲ ▲

from 5-in. angle channels and forming the outside of the frame, together with rectangular braces in both ends of the frame. All braces are welded in place. The frame is supported by hangers mounted on wrought iron bearings, making the loading device flexible so that in severe tests made the freight cars shunted into were badly damaged without injury to or deflection in the auto-loader.

When not in use, the auto-loader folds into the roof of the car, projecting down only 3 in. below the top of the wall line. No tools other than a small motor to raise the deck into position are required for the loading operation. A crew of two men can load a freight car with the auto-loader in less time than four men could do the same task with old loading materials.

The hangers or arms are made of seamless steel tubing 2⅜ in. in diameter and 111 in. long. The legs are of the same material 1¾ in. in diameter and 63 in. long. Two telescope tubes, one of which is 2⅜ in. in diameter and 40 in. long, and the other 1⅜ in. in diameter and 78½ in. long, are part of the auto-loading equipment. Both tubes are made of seamless steel tubing.

To hold in position the two automobiles which are run onto the floor of the freight car and remain there without being raised, eight floor tube assemblies have been installed in each car. This assembly consists of a heavy chain, which is attached to the front and rear of the automobile, resting in a tube 24 in. long and 5 in. in diameter. When the freight car is not used to carry automobiles, the chain folds down into this tube which is buried in the floor. The tubes are kept free from dirt, dust and other foreign materials by means of hinged cover plates, flush with the floor.

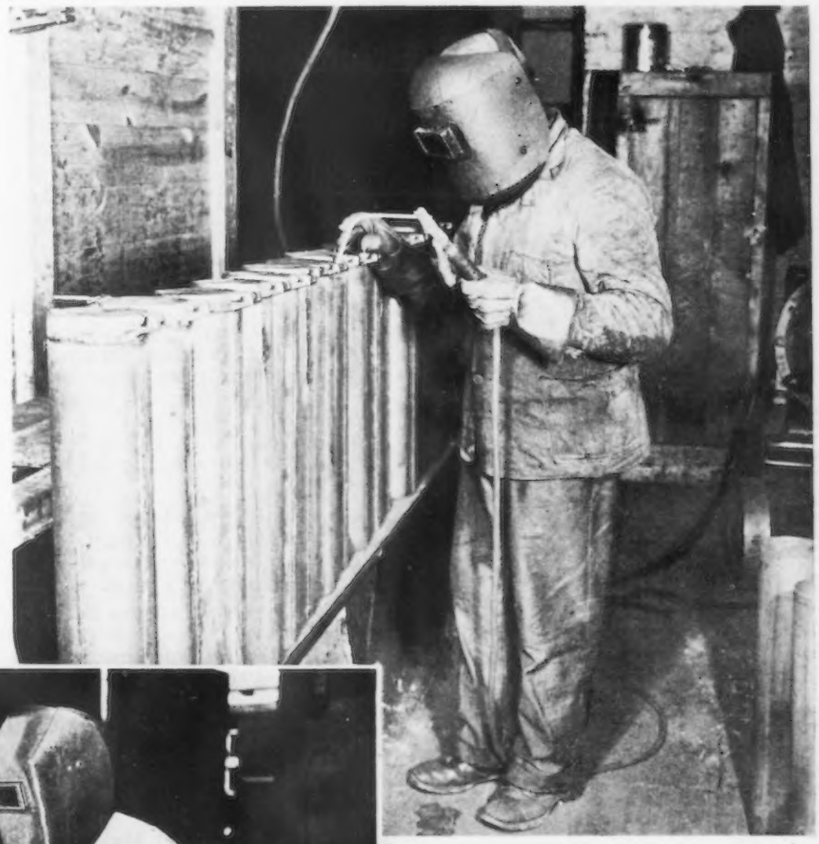
Actual manufacture of the auto-loaders is in the hands of the Lumber Products Corpn., Detroit, a subsidiary of the Evans Products Co. This company formerly made the wood products used in the loading and unloading of automobiles in freight

(*Concluded on Page 74*)

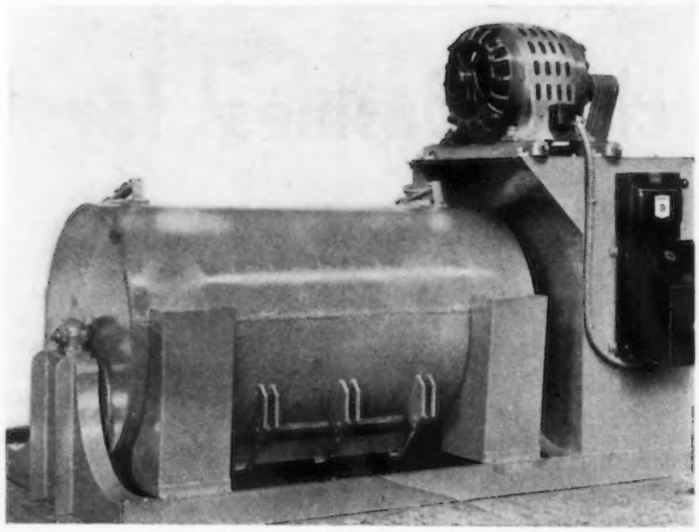
▲ ▲ ▲

Cover plates (at right) are welded onto floor tubes, this arrangement of the work being used to save operator's time.

Assembly of loading device (below) requires many welding operations. Here the forging is being arc-welded onto the end of the tubular front arm.



Tumbling Barrel Obviates Manual Handling of Stars



MANUAL handling of stars and other tumbling material is eliminated in the tumbling equipment illustrated, which makes use of a side-loading barrel with a central tumbling section and two end-sections for receiving the separated stars. Passages of patented design transfer the stars to the central section when the drum is rotated in the tumbling direction and return them to the end-sections when the drum is rotated in the opposite direction. The work may be packed to the full capacity of the tumbling section in much the same manner as in previous styles of barrel, but with the stars in the end-sections and the central section empty, more efficient packing of the work is said to be possible.

The new barrel may be employed for wet as well as dry tumbling, according to the manufacturer, N. Ransohoff, Inc., Cincinnati, Ohio. In the wet process, hollow trunnions allow the entry of a water spray which is used to rinse the finished work just before its removal and for washing the stars in their compartments, screen patches being provided for draining the star sections. When the barrel is used for dry tumbling the hollow trunnions are fitted for connection with a dust exhaust system. The barrel is offered for use in foundries having large and delicate castings to be cleaned and in forge shops for the removal of scale from front axles, crankshafts and similar parts.

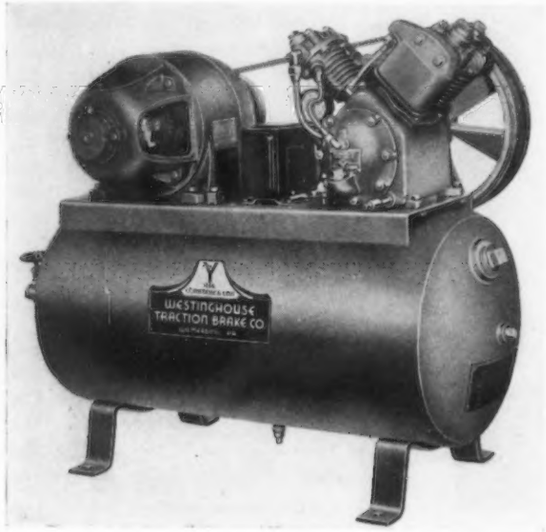
Air Compressors for Industrial Uses

WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa., is marketing a line of new air compressors, in sizes from 4 to 31 cu. ft. displacement, for any industrial use, against pressures up to 200 lb.

These machines are of two-cylinder compound, air-cooled type designed for continuous operation. They have controlled combined pressure, and splash lubrication to all vital parts. The two-stage compression (with intercooler), together with liberal radiating surface provided by deep-finned cylinders that are constantly swept by a stream of air from a fan, assure that the air temperature is kept at a minimum. Development of excessive frictional heat is prevented by ball bearing mounting of the crankshaft.

The unloading feature is interlocked with the oiling system to prevent the compressor delivering air when the oil supply is depleted.

Various types of units are available. In one the motor and compressor, with pressure control apparatus, are mounted on a tank having either legs for fixed installation or casters for portable use. A bed plate mounting for floor or sill installation, with separate tank, and a bare compressor with flywheel for line shaft, gas engine, or other power take-off drive, can also be furnished.

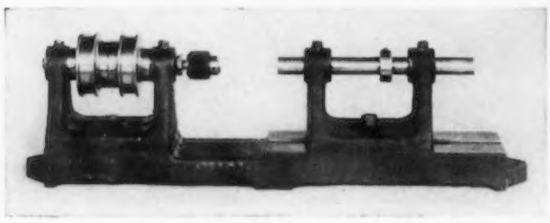


(At left): The tank of the compressor unit may be mounted on casters for portable use.

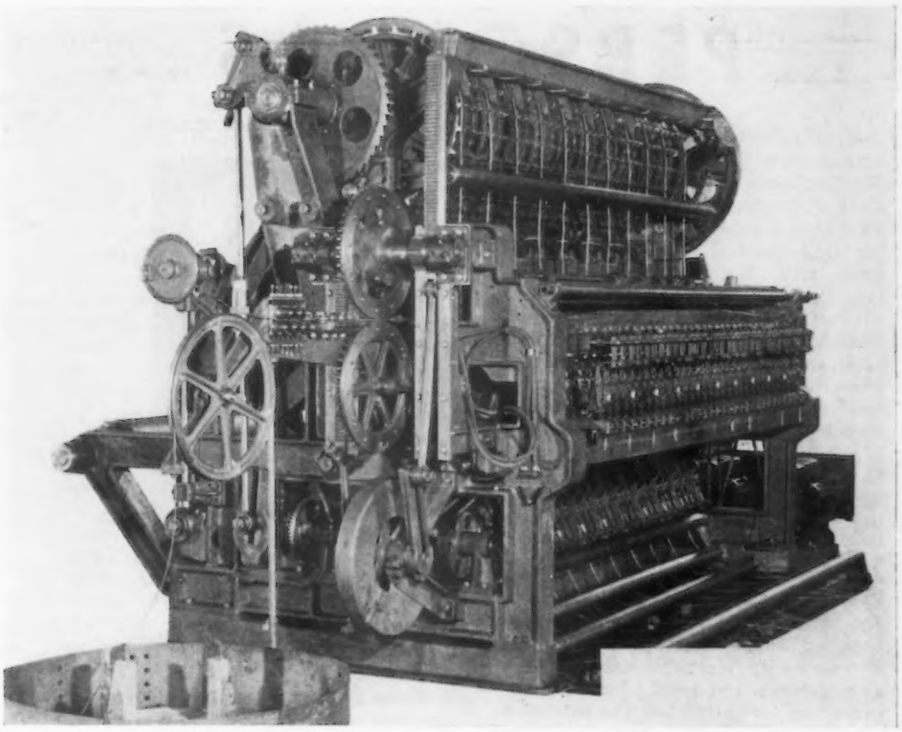
(Below): Optical, radio and other small parts may be tapped on production basis.

Improved Bench-Type Tapping Machine

FOR production tapping of optical, radio, electrical and similar small parts, the Langelier Mfg. Co., Providence, R. I., is offering the redesigned bench-type machine illustrated. The capacity is 3/16 in. in sheet metals. The machine is driven by means of open and crossed belts through a friction clutch, the spindle running inside a bronze sleeve on which the pulleys are mounted, an arrangement that eliminates belt pull on the spindle and permits it to float and to change the direction of rotation easily. The spindle is equipped with a No. 1 Jacobs chuck. A tail stock is provided, and its shaft has a tapered socket so that if necessary fixtures can be used to aline the work on the tap. The distance from the bed to the center of the spindle is 3¼ in. Bench space of 22 in. by 4 in. is required for the machine.



Automatic Welder for Reinforcing Mats and Other Wire Fabrics



FOR the production of welded mats for road reinforcing and of other steel fabrics from rods or wire of any size up to ½ in., the Thomson-Gibb Electric Welding Co., Lynn, Mass., has developed the machine here pictured.

Operation is completely automatic. Longitudinal and cross wires are fed directly from reels except in the case of cross wires and rods that are heavier than No. 2 gage, which, previously straightened and cut to size, are fed automatically from a magazine. Cross and longitudinal spacing is fully adjustable.

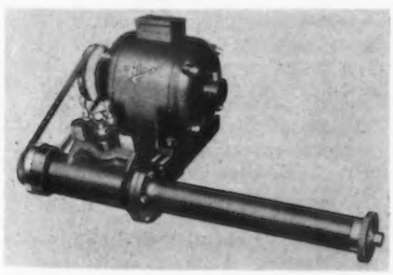
The welded mats are delivered either flat or reeled to suit the weight of the fabric, and can be slit automatically by the machine to make strips of two widths at the same time. The machine makes 32 or more welds simultaneously and can produce as much as 60 tons of welded fabric in a 10-hr. day. Other models are available for the heaviest types of bar mats.

Internal Grinder for Lathes and Boring Mills

AN internal precision grinder for use on lathes and boring mills is being made in four sizes, from ½ to 3 hp., by the Hisey-Wolf Machine Co., Cincinnati. Construction throughout is for continuous duty and the machines are suitable for production as well as odd-job work.

Constant-speed motors which operate at practically the same speed under any load within their rated capacity assure steady, uniform grinding action. It is stated that ordinary vitrified wheels can be used with safety. The machines are designed so that they will grind up to the full swing of the lathe or boring mill on which they are used. The dovetail slide with screw feed and handle permits rapid adjustment of the wheel to the center of the work, and this adjustment does not affect the belt tension.

As the grinding wheel together with the motor can be swung end for end, grinding can be done either at the right or left of the machine. Direction of rotation of the wheel is reversible through the motor.



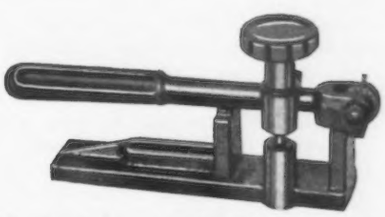
Constant-speed motors are employed.

Emery-Wheel Dresser Holders

TWO styles of emery-wheel dresser holders designed for use on many kinds of ordinary-type and special grinding machines are being marketed by the Graham Mfg. Co., Providence, R. I.

One style is made with a long base and the other with a square base, as illustrated.

The tops of the upright projections of the holder, on which the dresser handle is mounted, are made V-shaped to accommodate Huntington type dresser handles, or to take ordinary round-shank diamond holders. These projections also have flat shoulders for supporting Huntington style holders at the head close to the cutters. The tops of these projections can be made to suit any special type of dresser handle. A hook clamp actuated by a knob and screw holds the dresser handle in place. The center of ordinary dresser cutters is a little over 3 in. above the surface of the table. The square-type base is 4¼ in. square and the long type base is 2 in. wide and 9 in. long.



The long-base emery-wheel dresser holder is shown at left. Both styles have slots for bolting.

... PERSONALS ...

H. D. JAMES, control expert and long a consulting engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, has opened an engineering consulting service specializing in industrial and building problems, with office at 1532 Gulf Building, Pittsburgh. For manufacturers without technical staffs, the organization offers technical information, assistance in purchasing where engineering questions are involved, cost analysis, and design of equipment. Experienced engineers working under Mr. James' personal supervision will be available for special assignments, including electronic and air conditioning applications.

He has about 150 patents to his credit, is an authoritative and well known writer for technical magazines and author of the only recognized book on motor control. During his 30 years with Westinghouse, his work as organizer and head of control engineering has attracted the attention of company executives and other leaders in the electrical industry.

Mr. James was born at Baltimore in 1874 and received his preparatory education at the Kenyon Military Academy, Cambier, Ohio. He was graduated from the University of Pennsylvania in 1895, receiving the degree of Bachelor of Science and a year later received the postgraduate degree of mechanical engineer. He was engaged in work on I.T.E. circuit breakers in Philadelphia for a short time and then entered the employ of the Otis Elevator Co., working at Yonkers, N. Y., New York and Pittsburgh. He entered the employ of the Westinghouse company on Feb. 1, 1904, and has been with the company continuously since.

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MORRISON M. NEMIROVSKY has been elected president of the Samuel Machinery Co., Philadelphia, to succeed his father, the late SAMUEL NEMIROVSKY.

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ROBERT J. PARDEE, who was formerly connected with the Toledo Machine Tool Co. for 17 years, and who was recently with the Cleveland Punch & Shear Works Co., Cleveland, has resigned his position, with the intention of taking a rest.

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R. A. ZILM, formerly domestic and European sales representative of the Lees-Bradner Co., Cleveland, is now affiliated with the Cleveland Duplex Machinery Co., Inc., in the sale of machine tools and special machinery. Prior to his connection with the Lees-Bradner Co., Mr. Zilm was identified with the Otis Steel Co., Cleveland, in the foundry and sales divisions.

H. D. JAMES

HERBERT A. STANTON, European manager of the Norton Co., Worcester, Mass., has just returned to his London office after a visit of several months to this country. Other members of the Norton European organization who recently returned to their plants after visits to the home office are: MICHEL BISCAYART, of Compagnie des Meules Norton, Paris; OTTO SCHUTTE, Deutsche Norton Gesellschaft, Wesseling, Germany; WILLIAM HADDOCK, Norton Grinding Wheel Co., Ltd., Welwyn Garden City, England.

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J. P. KRUMECH, formerly traffic representative of the American Car & Foundry Co., New York, has been appointed traffic manager.

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GEORGE D. SHANAHAN, for the past eight years vice-president and general manager of the Motors Metal Mfg. Co., Detroit, has been made general manager of the Bossert Corpn., Utica, N. Y. Prior to his connection with the Motors Metal Company, Mr. Shanahan was general manager of the J. W. Murray Mfg. Co., Detroit.

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EYVIND W. PETERSEN, for many years identified with the Doehler Die Casting Co. and for the past 11 years metallurgical engineer for Fairbanks, Morse & Co., has been appointed representative in the Chicago-Milwaukee district by the St. John X-Ray Service, Inc., Long Island City, N. Y. He is now consultant to the non-ferrous foundry trade.

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E. V. PETERS has been elected a vice-president of the St. Joseph Lead Co.

FRANK G. DAVIS, formerly of the Firth-Sterling Steel Co., McKeesport, Pa., has become general sales manager of the Peninsular Steel Co., Detroit.

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J. A. SISTO, of the New York investment house of the same name, has been elected president and chairman of the board of the Barium Steel Corpn., Canton, Ohio. C. E. MIDDLETON has been made vice-president and general manager, C. F. NORSWORTHY, secretary, and L. C. MILLER, treasurer.

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E. G. VAIL, former president of the Gurney Refrigerator Co., Fond du Lac, Wis., has been appointed administration member on the code for the railroad brass car and locomotive journal bearings and castings industry.

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JOHN HUNT, M. J. Hunt's Sons, Philadelphia, was elected president of the Philadelphia chapter of the Institute of Scrap Iron & Steel at the annual meeting of the chapter on March 14. Other officers elected were: vice-president, WALTER S. GATES, Charles Dreifus Co., Philadelphia; secretary, GEORGE STOUT, Luria Bros. & Co., Inc., Philadelphia, and treasurer, PHILIP BAILIS, Max Bailis & Sons, Philadelphia. In addition to the officers, the executive committee will consist of J. V. S. BISHOP, Bishop & Co., Philadelphia; L. Raphaelson, Wilmington, Del., and T. BANTIVOGLIO, Camden Iron & Metal Co., Camden, N. J. The local code authority of five dealers, which was also elected at the meeting, will consist of J. MALLOY, Malloy & Schreiner, Philadelphia; JOHN HUNT; H. KIRCHMANN, Allegheny Iron & Metal Co., Philadelphia; WILLIAM FOREBAUGH, Luria Bros. & Co., Inc., Philadelphia, and DAVE POLLOCK, Pottstown, Pa.

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DAN M. AVEY, editor of *Foundry*, Cleveland, has been appointed administration member of the code authority for the ladder manufacturing industry.

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JOHN F. ROCHE, executive vice-president, Binks Mfg. Co., Chicago, maker of spray equipment and cooling systems, has been appointed to membership of the Illinois Advisory Board of the National Emergency Council.

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DR. HAROLD MOORE, who has been elected president of the (British) Institute of Metals, began his metallurgical career as a pupil of the late Dr. J. E. Stead, Middlesbrough. In 1899, at the age of 21, he joined the staff of the Islip Iron Co., Northamptonshire, as chemist, and obtained experience in blast furnace practice. In 1901 he became research metallurgist at the Parkhead Steel Works

of William Beardmore & Co., Ltd., where his work in connection with the manufacture and heat-treatment of armor-plate developed an interest in alloy steels. In 1904 Dr. Moore joined, as chief metallurgist, the research department at Woolwich Arsenal where he remained until 1932.

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B. F. BILSLAND has been appointed manager of the Chicago district office of the Allis-Chalmers Mfg. Co., located at 20 North Wacker Drive. ARCH J. COOPER has been appointed assistant manager of the New York district office, 50 Church Street, of which A. F. ROLF is district manager.

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HERMAN F. KLUENDER has been elected vice-president of the Detroit Alloy Steel Co., Detroit.

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P. J. HOPKINS, who was associated with the Cleveland Punch & Shear Works Co., Cleveland, from 1910 until he left to engage in business for himself in 1927, has returned to the company in a sales capacity.

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ROBERT B. SCHENCK, heretofore identified with the Pittsburgh Crucible Steel Co., has been appointed chief metallurgist of the Buick Motor Co. He returns to a post he previously held for 17 years. He was graduated from Lehigh University in 1910 and after a connection of five years with the United States Steel Corpn., he entered the automobile industry as chief metallurgist for the Weston-Mott Co.

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H. B. KLUSMEYER, who for the past 18 years has been manager of the Chicago office of Aluminum Products Co., La Grange, Ill., has been made vice-president in charge of Chicago sales.

Illustrated descriptions of the Soviet standard blast furnace, the Schiffer-Strack stove checker system, the Beaton-Ledbetter tuyere for blast furnaces and the multi-zone static gas washer feature the latest publication of the Freyn Engineering Co., 310 South Michigan Avenue, Chicago. The Russian installation and some of the equipment mentioned have been the subject of recent articles in these columns, but the issue of "Freyn Design" brings these matters as well as a series of brief articles on steel mill equipment within the covers of a single pamphlet.

Aluminum Industries, Inc., Cincinnati, had net profit of $100,208 in 1933, compared with a net loss of $70,889 for 1932. Sales in 1933 increased $419,630, or approximately 24 per cent over the previous year.

... OBITUARY ...

THOMAS PARROCK, retired district superintendent of the Republic Steel Corpn., died at his home in Youngstown, Feb. 20, aged 82 years. He was in important factor in the building up of the old iron trade in Youngstown through the two decades ended with 1905, when he retired on account of failing health. He was born in Staffordshire, England, but in 1880, when he came to the United States, he was a skilled roll turner and took charge of a mill of the Catasauqua, Pa., Mfg. Co. Two years later he joined the Trumbull Iron Co. at Girard, was shortly later identified with the Cartwright McCurdy Co., which achieved distinction in that day by installing a Morgan continuous mill for rolling cotton ties, and in 1892 became a director of the Union Iron & Steel Co. In 1900 he was appointed district superintendent of the Republic Iron & Steel Co. He was one time president of the Youngstown Foundry & Machine Co., which he helped to organize. H. P. PARROCK, consulting engineer, Wellesley, Mass., is one of his sons.

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RICHARD B. TILEY, for many years an officer of Tiley-Pratt Co., Essex, Conn., wire spokes, was killed in an automobile accident at St. Petersburg, Fla., March 5. He and his brother sold the business to the Torrington Co. about six years ago.

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ARTHUR CARROLL HARVEY, formerly president of the Arthur C. Harvey Co., Boston, heavy hardware, and closely identified with the New England iron and steel industry, died at his home in Wellesley Hills, Mass., on March 6. He was born in Boston 69 years ago, and entered the iron and steel business at an early age.

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HUDSON E. BRIDGE, chairman of the board of Bridge & Beach Mfg. Co., stoves, died at his home in St. Louis March 4 of heart disease. Mr. Bridge was born in St. Louis 75 years ago. After attending Washington University, he began his business career with the stove company, which had been founded by his father, also HUDSON E. BRIDGE, in 1837. He had been inactive in the management of the business for about 10 years, although retaining the position of chairman of the board. Two sons, LEIGHTON and LAURENCE BRIDGE, are officers of the company.

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AUGUST F. REICHERT, pioneer Milwaukee industrialist and mechanical expert, died March 6, aged 83 years. He was born in Germany, learned the machinist trade there and came to America when 22. While associated with the Harnischfeger Corpn., Milwaukee, he is said to have perfected the original steel forms for monolithic concrete construction. Later he engaged in the manufacture of the forms as the Reichert Mfg. Co. for many years, disposing of the business to the Metal Forms Corpn., Milwaukee, in 1917.

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OTTO G. BICK, president of the Western Stamping Co., St. Louis, died there on March 4. Mr. Bick was 72 years old, and went to St. Louis 18 years ago from St. Paul, Minn.

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I. WILKOFF, president and treasurer of the Wilkoff Co., Youngstown, died in that city after a long illness on March 6, aged 48 years. He was one of the founders and directors of the Institute of Scrap Iron and Steel.

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RUDOLPH F. FLINTERMANN, president, Michigan Steel Casting Co., Detroit, died on March 7 after a month's illness. Born in Detroit in 1871, he was graduated from the University of Michigan and for six years was in the Dakotas as an instructor and metallurgist. In 1901 he became chief metallurgist of the International Harvester Co. at Chicago, a position which he held for six years until he organized the Michigan Steel Casting Co.

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WILLIAM E. DICKS, who had been connected with the sales department of the St. Louis office of the Bethlehem Steel Co. for the last year and previously for 14 years a manufacturers' representative in Detroit, died recently in the former city after a month's illness due to a throat infection. He was 45 years old.

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STEPHAN J. HAUSER, vice-president of the Hauser-Stander Tank Co., Cincinnati, died after an operation for appendicitis at St. Petersburg, Fla., on March 11, aged 49 years. He had been vice-president of the tank company for the past 12 years.

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CHARLES W. MARSTON, long associated with his brother in J. M. Marston & Co., Boston, which was established by their father, and which is engaged in the manufacture of power saws and general machinery, died March 10 at his home in that city.

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MARCUS CHASE, for many years manager of the Boston office of Niles-Bement-Pond Co., died at his home in Belmont, Mass., on March 16. Mr. Chase retired from business several years ago. He was widely known in

the machine tool trade and particularly in the New England railroad shops.

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HARRY EMIL DECKEBACH, prominent figure in the copper industry in the Midwest for the last half century, died suddenly of a heart attack at Coral Gables, Fla., on March 13. He was 72 years old. Mr. Deckebach was president and treasurer of the F. C. Deckebach Sons Co., coopersmiths.

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WAYNE C. BOGUE, for a number of years a traveling salesman for Carnegie Steel Co. out of its Detroit office, died March 14, at his home in the Plaza Hotel, Chicago. He was 57 years old. Mr. Bogue's first experience in the steel business was in the purchasing department of the American Steel & Wire Co., which he later served in the sales department.

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JOHN G. SHARP, former assistant treasurer, the Western Electric Co., Chicago, died recently at the age of 73 years. Mr. Sharp was born in Medford, N. J., and had been with the Western Electric Co. for 35 years. He retired six years ago.

Strong Japanese Demand For Tin Plate Wasters

NEW YORK, March 20.—During the month, Japanese trading concerns have purchased over 3000 tons of tin plate wasters for April, May and June shipment. The average equivalent price paid was $3.75 to $3.80 per 100 lb., c.i.f. Japanese and Chinese ports. There is quite a scarcity of wasters in the market, and Japanese consumers are unable to secure as much material as they would like to have. Large Japanese can companies have been the principal buyers, as they wish to relieve the market of the wasters so that small independent concerns cannot fabricate cheap cans in competition. The large companies claim they are fabricating toys and novelties from the tin plate.

For soldering stainless steels, monel and other metals, the Berry Solder Co., Inc., 19 Rector Street, New York, is marketing a hard acid core material designated as "Leek-Pruff." This wire type solder contains its own flux within the core, the flux being non-liquid and said to eliminate sputtering fumes and leakage.

Robins Conveying Belt Co., New York, has acquired from T. M. Chance Estate, sole sales, engineering and construction rights in United States and Alaska to Chance sand flotation process for cleaning bituminous coal. Joseph Parsglove, Jr., will represent estate of T. M. Chance, as consulting engineer.

British Pig Iron Active—IRMA Books 38,000 Tons of Rails for Argentina

LONDON, ENGLAND, March 20 (*By Cable*).—Pig iron producers are heavily sold and additional orders have necessitated further increases in production. Hematite is selling briskly at new prices. Export business in pig iron is meager.

The steel trade is busier, with heavy bookings of rails, plates and shapes. New business in semi-finished steel is quiet, but works are busy on old contracts and view the future confidently, although some orders are going abroad. Three thousand tons of shapes have been shipped to Odessa and further substantial shipments to Russia are expected under trade agreement.

Tin plate is quiet, but demand is steadier. February shipments were small, but improvement is expected this month.

Continental iron and steel markets are fairly active, particularly exports of semi-finished steel to United Kingdom, Japan and Italy. Sales offices have decided to abolish gold prices for English and American home trade and quote paper pounds and paper dollars respectively. Reduced prices for Manchuria owing to Japanese competition are also to be quoted.

The International Rail Makers Association has secured the Argentine Government contract for 38,000 tons of rails. Meetings of the International Wire Export Co., the International Rail Makers Association and the International Steel Cartel are to be held in Luxemburg March 21 to 23.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hrth.	£5 10s.	to	£5 12s. 6d.
Tin plate, per base box	16s. 3d.	to	16s. 9d.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hrth.	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£9 5s.		
Galvanized sheets, No. 24 gage	£11 5s.	to	£11 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

*Ingots	£2 5s.		
*Billets, Thomas	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
*Steel bars, merchant	£3 2s.	6d.	
*Sheet bars	£2 8s.		
Plates, ¼ in. and up	£4 1s.	6d.	
*Plates, 3/16 in. and 5 mm.	£4 3s.	6d.	
*Sheets, ⅛ in.	£4 8s.	6d.	
*Ship plates	£4 10s.		
*Beams, Thomas	£2 19s.		
*Angles (Basic)	£3 2s.	6d.	
Hoops and strip steel over 6-in. base	£4		
Wire, plain, No. 8	£5 7s.	6d.	
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

*Prices as established by European Raw Steel Cartel.

Prices Filed With Institute

NEW lowest base prices filed with the American Iron and Steel Institute follow:

	Base Price Per 100 Lb.	F.O.B. Basing Point
Tinned high-carbon curtain spring wire (effective March 16)	$11.00	Cleveland

	Base Price Per Wheel, Untreated	
Street car and interurban wheels, 26 in. tread diameter (March 26)	$19.25	Pittsburgh

Rim dimensions: 3½ in. x 2 in.
Hub diameter: 7 in.
Nominal bored weight: 360 lb.

	Base Price Per Wheel, Untreated	
Light-weight car wheels (March 13)	$16.50	Pittsburgh

Diameter: 33 in.
Type: L. W. freight car
Rim dimensions: 5½ in. x 1¼ in.
Hub diameter: 10½ in.
Nominal rough bored weight: 610 lb.

	Base Price Per Lb.	
Chrome-silicon steel:		
Carbon 0.40%		
Silicon 3.80%		
Chrome 2.20%		
Electric furnace (March 23)	5.14c.	Chicago
*Open-hearth (March 23)	4.89c.	Bethlehem, Pa.

*The member of the code filing this price states that this material will be furnished only as acid open-hearth product.

	Base Price	
Stainless Steel:		
Carbon 0.12%		
Chrome 13.00%		
Silicon 1.00%		
Copper 1.00%		
Ingot (March 15)	Withdrawn	Pittsburgh
Carbon 0.12%		
Chrome 8.00%		
Nickel 18.00%		
Silicon 1.25%		
Re-rolling billets (March 15)	Withdrawn	

Transverse tests of sand-cast aluminum alloy bars do not seem to yield any information concerning ductility that is not obtained equally readily from the tensile test, according to C. E. Phillips and J. D. Grogan, National Physical Laboratory, Teddington, England, in a paper presented to the recent meeting in London of the Institute of Metals. The authors hold the tensile test to be preferable to the bend test.

THE NEWS OF THE WEEK

Opposition to Wagner and Connery Bills Increasing—Steel Institute Files Protest

OPPOSITION to the so-called Wagner labor control bill and the Connery 30-hr. week bill which are now being considered by Congress is taking definite form in the steel and automotive industries. Formal protests were released last week by the American Iron and Steel Institute, the National Association of Manufacturers and the National Automobile Chamber of Commerce. These have been followed up by meetings of steel company executives in New York, Chicago, Pittsburgh, Cleveland and Birmingham, at which all interested parties were urged to file objections to the bills with their representatives in both houses of Congress. At the Pittsburgh meeting on March 19, representatives of 50 companies were in attendance and listened to Earl F. Reed, attorney for the National Steel Corpn., explain the objectionable features of both bills.

It is expected that a number of representatives of the steel industry will appear in Washington this week before the committees of the Congress to voice opposition to the legislation.

Would Destroy Employee Relationships

In its statement last week, the American Iron and Steel Institute protested the Wagner bill as follows:

The bill is designed to control all labor matters by political rather than economic forces and to destroy the friendly relationships now existing between employers and employees and thus disrupt the industrial welfare of the nation.

The chief object of the bill is to turn the control of American industry over to a national labor union monopoly, notwithstanding the fact that national labor unions by appeals for voluntary membership over a period of many years have succeeded in enrolling less than 10 per cent of the workers of this country in their ranks.

Employees of iron and steel companies have made remarkable progress with their plans of employee representation, which have been in effect among employees of some of the companies for more than 15 years. It is now proposed to undo all such progress and by legislation to force the workers of the country into national labor unions. During this same period, the workers of the country have seen the national labor unions pursue many economic fallacies including the throwing out of work of large numbers of men because of useless jurisdictional controversies.

The bill seeks to create a permanent National Labor Board with more power than any governmental agency has ever had or than any court in the land possesses today. Even during the World War, The War Labor Board had no such sweeping power as that sought to be given by the Wagner bill.

Under the provisions of the bill it is an offense, subject to fine or imprisonment, for an employer to participate in any way in any organization of his employees or even to compensate them for working time lost while engaged in furthering the interests of their fellow employees or settling their difficulties with the management. Any friendly contact between an employer and his employees in which the employer expresses his preferences for one form of organization or another might also be considered an offense by the labor board and subject the employer to the penalties of the act. Although the employer is vitally affected by any agreement with his employees, he would not be permitted to express any opinion as to whether the organization with which he is required to deal is truly representative. On the other hand there is nothing in the labor bill that restrains the unions from any manner of influence or coercion.

Although the employer is denied by law the right to have an injunction in the Federal courts to protect his property, no such restriction is placed upon the labor unions. The board may hold its hearings in Washington and summon witnesses and records from any part of the United States, without regard to the consequent inconvenience and expense, and its findings of facts are conclusive.

It may assess damages against an employer in unlimited amounts, but it is astounding to find that the bill does not provide for the assessment of any penalties or damages against labor unions.

We do not know of any law which puts such arbitrary and complete power in the hands of any board or court, and we believe that industry could not function under such a law.

The statement of the National Association of Manufacturers said in part:

In total disregard of every fundamental concept of legal rights and remedies, Senator Wagner of New York, chairman of the National Labor Board, has introduced legislation described as intended "to equalize the bargaining power of employers and employees" and "to encourage the amicable settlement of disputes between employers and employees." To accomplish this end he would endow the labor board with powers over employment relations, more boundless than those ever possessed by any other agency of the Government either in time of peace or in time of war.

There can be no doubt from a careful reading of the bill that it would not be an instrument for alleviating labor disputes but would project new issues of such a controversial nature into the battle for economic recovery that the upward movement might be further halted. It would not equalize bargaining power but would confer monopolistic powers upon one minority group to the virtual exclusion of the common rights of the mass of workers.

Not only would an employer be barred from effectively negotiating directly with his employees in the interest of industrial harmony and continuity of industrial operation, but the bill would make the Federal Government a muster-sergeant for unionizing the millions of workers who for their own good reasons have declined adamantly through the years to affiliate themselves with national unions. Section 7-a of the National Industrial Recovery Act guaranteeing workers the right to choose their own form of bargaining with their employers would become but so many idle words as organizers set out with the weight of the labor board behind them to force workers to pay tribute to support an organization which has never been able to attract more than a small percentage of the nation's wage-earners.

The following telegram was sent to U. S. Senators and Representatives in whose districts are situated the plants and properties of the steel companies in the Pittsburgh District who are signers of the steel code. It was

adopted at a meeting of executives of those companies held in Pittsburgh Monday, March 19.

We are gravely concerned over the possibility of enactment of the Wagner bill S. 2926 and similar measure in the House, the Connery bill HR 8423; we are meeting here in Pittsburgh today as executives of iron and steel companies in Western Pennsylvania, Eastern Ohio, West Virginia and Western Maryland which are property owners and taxpayers giving employment to thousands of workers and representing the investments of an even greater number of individual stockholders, who are citizens, property owners and taxpayers for the purpose of urging you to make the most careful study of these two bills so that you may see that they constitute discriminatory class legislation and that enactment of either of these measures into law will inevitably result in establishing a national monopoly of union labor which will bind all industry, trade and commerce in America into servitude to a small group of paid professional labor leaders representing less than ten per cent of all workers in the United States and result in disrupting the long-established and rapidly growing friendly relationships between capital and labor by regulating their intercourse in terms of warfare rather than as associates in a joint industrial enterprise.

We also call your attention to the fact that the demand for this legislation emanates from this small group of professional union leaders who see their sinecures lost to them under the bill of rights for all American workers contained in Section 7a of the NIRA, which provides free of cost through government every benefit and gain to workers that union leaders have for generations been promising to obtain for them, on which account these professional leaders are now frantically alarmed over their own situations and are seeking as a last resort to drive our government into the business of organizing all labor into a monopoly for them to manage.

We further call your attention to the outstanding fact that the vast majority of more than 90 per cent of American labor which has steadfastly refused throughout the years to join national and local union labor organizations is making no demand for this legislation but on the contrary is rapidly taking advantage of the provisions under Section 7a to organize voluntarily into employee representation plans or company unions for collective bargaining on hours, wages and working conditions through representatives of their own choosing free of the burden of personal expense and domination attached to membership in the national labor unions.

The extent to which workers are showing preference for organizations within their own plants and under their own direction is indicated by reports made to National Industrial Conference Board by 3314 companies having 2,585,740 employees which reveal that above 45 per cent of these employees choose to deal with their employers through employee representation plans or company unions, while only a fraction over 9 per cent elect to bargain through national labor unions and the remainder to bargain individually.

It can be readily understood that this five to one preference of employees for their own plant organizations is viewed

(Concluded on Page 46)

Polish-German Steel Agreements Effective—Auto Industry Booming

HAMBURG, March 12 (*By Special Correspondence*).—The Polish-German iron and steel treaty will come into force on April 1 and extend until May 31, 1937. The treaty allows Poland to purchase up to 15,000 tons of iron and steel scrap in Germany each month at German domestic prices, which are approximately 25 per cent under the prices the Polish steel industry has paid hitherto for American, British and French scrap. The German steel industry is given special low import duties for all iron and steel products not manufactured in Poland, which will give Germany a virtual monopoly in Poland for these products. Included are transformer sheets, stainless steel products, special heat-resisting steels, castings, etc. The Polish industry gets an import allotment of 2300 tons monthly of alloy steels and thin black sheets on the German market.

Reports that the tube agreement between Japan and the Continental British tube cartel will not be extended beyond June, 1934, have been denied. Japanese bars are now selling in China and the Netherlands East Indies at prices which European makers can hardly meet at the moment, particularly since the recent price advance by the Continental steel cartel. Therefore, little business is being transacted with the Far East. On the other side, Japan is not competing as actively on joists, plates and angles, and business has recently been accepted at regular prices. South Africa, which for a long time was out of the market, is now buying again and has purchased important quantities of iron and steel products.

The Continental motor car industry is buying heavily at the moment. The German motor car show at Berlin is apparently a great success and orders are much heavier than last year. Production in 1933 was 55 per cent greater than in 1932. The Government road-building program and the fact that motor cars are entirely free from taxation give the industry another impetus, and production estimates for 1934 are 40 to 50 per cent above 1933.

Japan Orders New Tin Mills

THE Toyo Can Co. of Japan, through Mitsui & Co., Ltd., has placed an order for six hot mills and six cold rolling units for a tin plate installation with the United Engineering & Foundry Co., Pittsburgh. Auxiliary tinning equipment has also been ordered. The mill output will be used primarily for the fabrication of cans, and the new mill will be located either in the large industrial center of Osaka or in the more recently developed district of Hiroshima. The tinning equipment will be installed first, and the Imperial Steel Works will supply the necessary black plate until the new mills are completed.

The Toyo Can Co. anticipates an annual production of about 50,000 tons of tin plate from the new equipment. As Japan imported 59,770 tons of tin plate in 1933, the new capacity might occasion a severe decline in future imports, which would affect the American manufacturers who have supplied a considerable proportion of Japanese requirements during recent years.

On March 1 the more important steel plants in Japan combined into a single unit known as the Nippon Steel Works. The amalgamation was principally an absorption of six small independents by the powerful Imperial Steel Works. Prior to March 1 the individual concerns received government subsidies, but the reorganized company is capitalized at 365,000,000 yen and privately controlled by affiliates of Mitsui & Co., Ltd., Mitsubishi Shoji Kaisha, Ltd., and several others. The new Nippon Steel Works is currently producing 80 per cent of the pig iron and 70 per cent of the steel ingot output of Japan.

S.A.E. to Meet At Saranac Lake

THE Society of Automotive Engineers will hold this year's summer meeting at the Saranac Inn, Saranac Lake, N. Y., June 17-22.

John A. C. Warner, secretary and general manager, also announces appointment of Edward F. Lowe as assistant general manager and C. B. Whittelsey, Jr., as assistant secretary of the society. Mr. Lowe has been associated with the automotive industry for 20 years in engineering and executive capacities, and has long been active in the affairs of the S.A.E. He was one of the organizers of the Monarch Governor Co., Detroit, and later general manager of the K. P. Products Co., New York, and vice-president of the Handy Governor Corpn., Detroit. Mr. Whittelsey has been assistant to the general manager of the society since 1926. Following his graduation from Sheffield Scientific School, Yale University, in 1921, he was engaged in engineering and research with the Curtiss Engineering Corpn., United States Rubber Co., and Stone & Webster, Inc.

Steel Treaters Seek Abbreviated Name

WANTED:—A short popular name as a substitute for "Steel Treaters."

The designation, "Steel Treaters," that was commonly applied to the American Society for Steel Treating and is still being quite generally used, although the name of the society has been changed to the American Society for Metals, is not likely to be dropped unless an abbreviated name that meets sufficient popular approval to become universally applied to this society is adopted, in the opinion of Dr. Zay Jeffries, consulting metallurgist, Cleveland. The purpose of changing the name of the society will not be accomplished, Dr. Jeffries held, if the old common appellation of "Steel Treaters" is not also discarded. Dr. Jeffries made the above comment inviting suggestions for a popular short name for the society during his remarks in introducing, as technical chairman, Dr. Paul D. Merica, International Nickel Co., the speaker at the meeting March 12 of the Cleveland chapter of the American Society for Metals.

Tractor Welding Unit at Work on Western Railroad

THE practice of building up battered rail ends by the electric welding process has been given impetus through the use of combination machines such as here pictured.

Standard welding generators are mounted on a standard crawler tractor and driven from the power take-off shaft of the tractor. The unit shown above is equipped with two welding generators, thus permitting the simultaneous welding of both rails and reducing the supervision and investment cost per weld. The practice, as shown, is to use two welders, a grinder and helper, together with one foreman and, as the unit is self-propelled and 95 per cent of the time remains entirely clear of all train movement, the work progresses rapidly with the small crew. Unusually low unit costs are claimed. The tractor is the model 25 Cletrac built by the Cleveland Tractor Co., Cleveland.

Size of Samples for Hardness Tests

THE size of test samples for hardness determinations was the subject of a paper by Dr. G. A. Hankins and C. W. Aldous, National Physical Laboratory, Teddington, England, presented to the Institute of Metals at its recent London meeting. The investigation had reference particularly to Brinell tests on bars and thin plates, and the metals covered included copper, brass, aluminum and steel.

The conclusion of the authors is that a width of test-specimen of 4½ times the diameter of the impression is satisfactory for accurate Brinell tests on all the materials examined. In regard to the thickness of samples for Brinell tests, the limiting value of the ratio of thickness of test sample to depth of impression for accurate results appears to be a characteristic of the test material; a value of the ratio of 6 is required for mild steel, about 15 for copper, and more than 20 for spring steel. In carrying out diamond pyramid hardness tests on thin samples, a limiting value of the ratio of test-sample thickness to impression diagonal of 1½ gives results which are practically independent of test-sample thickness for the majority of sheet metals, with the exception of soft copper and soft brass.

Impact Testing of Cast Iron

AN extensive report on the usefulness of the several forms of impact test as applied to cast iron can be obtained at 50c. a copy from the American Society for Testing Materials, 260 South Broad Street, Philadelphia. It amounts to a compilation of the most comprehensive series of data in this category ever assembled. Research work extending over a period of three years and the correlation of the data were handled by the society's committee on impact testing.

Some 500 test bars were specially cast, machined and tested by the several methods investigated, on various types of machines commercially in use. Transverse, tension, fatigue, compression and shear tests were made and by the use of charts and illustrations these data are condensed in convenient form. Notched and unnotched Charpy and Izod tests were run, as well as repeated blow and drop tests. The conclusions of the committee in charge and the inclusion in the report of discussers' comments enhance the value of the publication. A chapter on the microstructure of irons in the impact investigation is included.

Bureau of Standards Studies Quenching

WASHINGTON, March 20.—Steels of apparently identical chemical compositions sometimes behave very differently when hardened by quenching. These rather mysterious differences are very disturbing in the hardening of carbon tool steels. One steel may harden completely throughout and thus produce a brittle, though hard, core, while another steel of the same composition may harden fully only at the surface but not completely deeper within the section, thus a much tougher core than the first steel results. This difference has been given various names, such as "body" or "timbre."

A detailed study of the subject is being made in the Metallurgy Division of the Bureau of Standards. Recently quantitative determinations have been made of the cooling rates during quenching that are just sufficient to harden these steels. The differences in these "critical cooling rates" and in the manner in which these critical rates change as the conditions of heat treatment of the steels are changed, are the causes of the differences in "body" or "timbre" of carbon steel.

Fairbanks, Morse & Co., Chicago, had consolidated net loss in 1933 of $1,147,340, compared with loss in 1932 of $2,547,231.

Federal Trade Commission Attacks Steel Code and NRA

STINGING attack on the steel code is made in a report submitted today to the Senate by the Federal Trade Commission.

Numerous charges are made. Among them it is declared that the price system under the code violates the Pittsburgh plus order of the Commission of 1924, issued against the United States Steel Corpn. prohibiting quotations upon any other basing point than the mill base. Suggestions are made for a court test of sanctions under the Recovery Act and also withdrawal of policies of enforcing codes.

Other charges are that the system tends to eliminate small enterprises not located at basing points; results in net mill prices which are discriminatory; discriminates against fabricators which are not located at basing points; has a tendency to centralize producing and fabricating industries at basing points in order to overcome the effect of imaginary freight charges; minimizes the usefulness of waterway and truck transportation; results in uneconomical cross-hauling between basing point areas; places powerful manufacturers in a position to compel the industry to discriminate in their favor; causes discrimination against such important steel producing centers as the Mahoning Valley in Ohio (Youngstown district).

Made under a resolution introduced by Senator Borah of Idaho, the report, consisting of 69 single spaced mimeographed pages, actually is a severe attack on the NRA itself. It points to a direct conflict between the NRA and the Commission, and the laws underlying each.

"The question naturally arises whether this situation of enforced violation of the Commission's order in the Pittsburgh plus case can be harmonized with the terms of the National Industrial Recovery Act and the powers therein conferred," the report pointedly states.

The commission concedes that the Recovery Act conceives the possibility of authorizing practices hitherto forbidden by the anti-trust laws but says that at the same time it sought to restrain promulgation of codes that were designed to promote monopolies or operated to eliminate or oppress or discriminate against small enterprises. The report charges that these practices have been adopted under the steel code. Inasmuch as all operations under the code are under the authority of the NRA it is clear the report is in effect an attack on that organization itself. It is a question whether or not it has not opened wide the doors for breaking down the fundamentals of the code structure for not only the steel but many other industries.

"A distinct conflict of means and objectives exists between the provisions of the code and the Commission's order in the Pittsburgh plus case," the report says in conclusion. "That conflict raises the questions not only of legal import but of basic economic implication. Departure from hitherto accepted policies of governmental concern over the maintenance of fair competition is, however, evident. Nevertheless it has been assumed thus far that departure has the sanction of Congressional mandate embodied in the National Recovery Act. The test of whether such a sanction is actually present in the act can, of course, be submitted to the courts for determination. But other means for the solution of such issues are also available. The work under the National Recovery Act was conceived of as necessarily being largely experimental. The act itself provides not only for means to pursue effectively paths demonstrated to be sound and desirable but also for means to withdraw from the enforcement of policies which evidence a tendency to attain ends regarded by the act as those that our national economy has discarded."

In much routine matter taken from code practices and in attributing the major price increases to charges for extras the Commission's report takes much of its material from the report of the Consumers' Advisory Board of the NRA. This report was submitted at the so-called price hearings on codes held several weeks ago.

The report restates the traditional position of the Commission in favor of quoting steel on a mill base in summarizing the alleged price-fixing and other practices and then launches into a brief attack on the matter of so-called resale prices to jobbers. Because of the power of the code authority, it is declared, to determine who may be classified as jobbers, the authority is able to force out of the jobbing business concerns who have long been engaged in that business but who do not conform to an arbitrary definition on the term "jobber."

The report attacks not only the basing point system but also the establishment under the code of additional basing points for both steel products and pig iron and it is declared that the use of common basing points has spread to industries other than steel and has been challenged in several Federal prosecutions as an instrument of price fixing. Citing increased basing points, it is declared that the essence of the Pittsburgh plus system applies on many products in its original form. Switching charges, all-rail as against water and motor truck delivery charges, etc., are all gone into, and hardly a shred of the code is left free of attack. By implication at least, the impression is gathered that the commission wants to take authority from the NRA and resume it for itself. Many complaints against the code from buyers of all classes are incorporated in the report as a means of supporting conclusions reached. On the policy of restricting production—referring to additional blast furnace, Bessemer, converter and open-hearth capacity, the report says the effect is to artifically protect investments in obsolete equipment, to maintain or increase costs at the basing point mills and to make necessary a higher basing price at the older basing points. Frequently mentioning the American Iron and Steel Institute, code authority for the industry, the report assails many of its rulings. Inasmuch as two Government representatives from the NRA are members of the code authority the attacks are taken necessarily to be directed at them as well as to the steel manufacturers. The report also attacks an editorial, "Let's Examine the Record," appearing in THE IRON AGE wherein it is shown that farm prices have decreased less than prices of metals and metal products. It is contended that the editorial formula of comparison is "meaningless and invalid" because the prices for steel are not separately shown. It is further charged the editorial "is invalidated by the fact that it is based not on steel prices but on those for metal and metal products, the prices of which have in most cases fallen in the depression far more than have the ferrous metals."

Green Asks Postponement Of Automobile Strike

WASHINGTON, March 20.—William Green, president of the American Federation of Labor, late today telegraphed to William Collins, representative of the A. F. of L. at Detroit, urging that the union automobile workers comply with the request of President Roosevelt and postpone their proposed strike, pending a meeting with the President of automobile manufacturers and workers in Washington on Thursday, March 22.

DETROIT, March 20.—The Central Committee of the Auto Workers Union, meeting in Pontiac, Mich., late today, voted unanimously to postpone for 48 hours the strike called for Wednesday morning, acting in accordance with the request of President Roosevelt.

Don't Shoot the Golden Goose!

SINCE late November, recovery in Detroit has become more than a promise. It is an actuality. Figures, the authenticity of which are unchallenged, prove it.

The employment index of the Detroit Board of Commerce stood at 99.1 on March 1, compared with 37.3 in November (the highest point reached in 1933 was 64.7). During the last 30 days, when the welfare load of the nation was increasing 4 per cent and the amount of relief expenditures 8 per cent, the Detroit welfare load declined 39 per cent and the amount spent 13 per cent.

A few months ago the City of Detroit was on the edge of bankruptcy. In recent weeks it has had over ten million dollars in delinquent taxes paid into its treasury and today is in a position to retire all of its scrip issues. Detroit street railway revenues are 35 per cent better than a year ago, and some divisions of retail trade have improved 60 per cent since the first of the year.

Flint, Mich., another automotive city, has the same story to tell. Its employment is so high that it has had trouble filling its CWA quota. Retail merchants are breaking all-time sales records. A shortage of desirable houses exists. Crowds on the downtown streets are indicative of a returning prosperity.

LOOK for a moment at the entire southern Michigan automotive manufacturing district. On Feb. 15 the number of automotive workers totaled 237,440, compared with 143,662 on the same day in 1933. The average weekly earnings per worker were $24.83, as against $21.43 in January and $18.69 on Feb. 15 of last year. In the last month the contrast with a year ago has become even sharper.

What of the effect on other industries? Flat-rolled steel mills, down to 25 to 30 per cent operations a few months ago, have been compelled to run at full capacity in many cases to meet the requirements of the automobile industry. The ingot rate of the steel industry has been almost doubled largely because of automotive needs. The tire industry has been lifted from the depression. Hundreds of parts and materials manufacturing companies throughout the United States have felt the stimulating effects of a revival of demand. The long dormant machine tool trade has been awakened to action partly by automotive purchases.

HERE is an industry which today is responsible for the direct or indirect employment of several million workers. It undoubtedly is the spearheard in the Roosevelt administration's drive toward recovery. It has orders ahead which assure it of continued operation at a high rate for at least three more months and probably through the entire summer.

Yet at the moment, when the industry is scaling the heights toward the production peak, the president of the American Federation of Labor publicly proclaims the fact that one of the greatest strikes in the history of American industry is impending at Detroit.

What is the main grievance? More wages? No, for the automobile industry's hourly wage rate is now above the 1929 level and the weekly earnings are 90 per cent of those in 1929. Less hours? No, because the industry is voluntarily reducing its average weekly working hours per employee to 36, in line with President Roosevelt's recommendations for all of industry.

If not wages and hours, what is the chief grievance? It is the refusal to allow the American Federation of Labor the privilege of being the spokesman for the industry's workers in collective bargaining.

IN an industry which always has paid high wages and today is second only to the printing industry in remuneration of its employees, the A. F. of L. notably failed for years to make gains in its efforts at unionization. It was not until it was armed with Section 7a of the National Recovery Act that it even thought it worth while to try to extend its dominance over an industry whose workers had consistently rejected its overtures. Even today, after nine months of intensive campaigning under the most favorable conditions which it ever can expect, it does not make so bold as to claim that a majority of automobile workers are enrolled in its ranks. It even has strong opposition from within labor circles, where the Mechanics Educational Society, which has recently formed a production workers division, is challenging its right to speak for all of automotive labor.

Yet we have the spectacle of the Federation's highest officials asserting that the national administration must enforce their demands meticulously or an immediate strike will be precipitated. Such a strike at this time, with Detroit in the vanguard of Recovery's forces, would be little short of disastrous. Under the circumstances the question naturally comes to one's lips, "Are these men chiefly interested in aggrandizement of their personal fortunes and the success of their own organization, or in National Recovery?" It is difficult to believe that in view of the position which they have assumed and of the indisputable facts and figures at hand that the nation's welfare is first in their thoughts.

THE demands on which they have concentrated at the moment, with wages and hours not of paramount importance, are evidence of the imperative need that the Federal government should act immediately to place upon labor unions responsibility and regulation equal to that already placed upon industry. The National Automobile Chamber of Commerce put its finger on the cause which has brought about the present threat to industrial peace when it said, "Today we have a tendency toward nationalization of business and industry under rigid control and an effort to organize labor on a nation-wide scale with no control or responsibility whatsoever."

Amend Railroad Resolutions; Interpret Clause Covering Identified Structures

TO further the interests of the President's recovery program the steel industry has extended the time in which rails and track supplies may be purchased by railroads until April 15, for delivery by Aug. 31. Last fall the Federal coordinator of transportation made it known that a large tonnage of rails and track material would be placed with the aid of Government loans provided that the rail price was reduced. The price was reduced to $36.37½ a gross ton, and on No. 15, 1933, the code restriction of steel deliveries to a period of four months after the date of making a contract was amended, in resolution No. 33, to permit shipment until June 30 on all tonnage placed by March 1. The first of March arrived, however, with only a small proportion of the promised tonnage contracted for. As a result, resolution No. 33 was amended on March 15 to permit the acceptance of contracts until April 15 and the making of deliveries until Aug. 31.

Similarly resolution No. 45 (adopted Feb. 2) was amended on March 15 to permit mills to accept contracts for rails and track supplies from manufacturers of frogs, switches and other special track work until April 15, for delivery by Aug. 31.

Commercial resolution 34, originally adopted Nov. 15, 1933, which exempts steel for Government-financed buildings, bridges and vessels from the four-month delivery restriction, was amended March 15 to include Government-financed railroad equipment in the exemption. The exemption, as specifically applied to railroad equipment in the amended resolution, applies to the following:

> Any product required by the purchaser thereof for use by such purchaser in the manufacture of railroad cars or locomotives or parts thereof (other than repair parts) for any railroad company which shall have agreed with any agency of the Federal Government to cause such railroad cars or locomotives or parts therefor to be manufactured in aid of the program of such Government for economic recovery, reemployment of labor or relief of distress, or otherwise for the advancement of public purposes and the general welfare, and for which product in every case such purchaser shall make a contract at a fixed price for such use thereof.

Commercial resolution No. 42, as amended Feb. 2, has been reprinted to correct a typographical error. This resolution allows pipe mills deductions from the market on purchases from other manufacturers of sizes and kinds of pipe required to build up a full line. The original resolution provided for a discount of 5 per cent, plus any deduction to jobbers, and, in case the pipe is sold in less-than-carload quantity, the amount by which the base price on carload quantities exceeds the base price on less-than-carload quantities. Under the correction, the discount of 5 per cent, plus the jobber's allowance, is increased *to the extent that the base price on less-than- carload lots exceeds the base price on carload lots.*

Commercial resolution 50, adopted March 15, amplifies resolution 29 on deductions from published prices allowed on railroad purchases, specifying that discounts for early payment are to be made against the full invoiced value of the product sold before making any deduction, not including, however, any part of the transportation charges.

Resolution No. 52, adopted March 15, interprets resolution 20 to mean that arbitrary switching charges shall be in terms of gross tons only if the published base price of a product at the basing point in question is in terms of gross tons. In all other cases arbitrary switching charges shall apply per net ton.

Resolution No. 53 exempts affiliated companies from paying code prices or observing code terms in the purchase of material to be manufactured into another product.

Resolution No. 51, adopted March 15, interpets and construes clause (b) of Section 4 of Schedule E in the interests of fair competition. The clause in question provides that delivered prices on plates, shapes and bars to be fabricated in an identified structure shall be computed at the place of delivery or the nearest freight station, and not at the shop of the fabricator. Since published freight tariffs include certain charges for the privilege of stopping plates, shapes and bars in transit for fabrication and such charges are not uniform, the inclusion of such charges in the delivered prices creates inequalities in competition, the preamble of the resolution states. The resolution provides:

(1) The term "identified structure" does not include a structure (other than ships or barges) which when assembled or erected in place does not have a fixed location at the point of erection. [Editor's note: This excludes railroad equipment.]

(2) Clause (b) does not apply when the all-rail rate on the fabricated material from the shop to the place of delivery is higher than the all-rail rate on the plain material from place of fabrication to point of delivery.

(3) In figuring the delivered price on plain material, the freight station nearest the point of erection shall be considered the place of delivery regardless of whether published freight tariffs provide through rates with the fabrication-in-transit privilege from the mill selling the steel.

(4) Freight charges resulting from routing a shipment through, or stopping it for fabrication, at the point at which the fabricator's shop is located are not to be added to the delivered price.

(5) The amount of freight which a mill may allow a purchaser of plain material must not exceed the lowest all-rail freight from the mill via the fabricating shop to destination plus additional freight charges for routing the shipment through or stopping it for fabrication, at the point where the shop is located.

Life of Roofs of Corrugated Sheets

IN a paper on the outdoor weathering of metals, presented before the American Society for Testing Materials, in Washington, March 7, R. F. Passano, research engineer, American Rolling Mill Co., Middletown, Ohio, expressed the opinion that the life of a corrugated roof is the life of the base metal *at the laps* and that an increase in the thickness of the base sheet will increase the life of the roof perhaps more than the increase in thickness would lead one to believe. Summarized, his findings based on a study of test data obtained largely from the samples exposed for years under the direction of committees of the society are as follows:

1. Zinc coatings of a given weight last longer than cadmium coatings of the same weight in localities where observations are available.

2. The amount of zinc coating required for a given amount of protection on the outside varies widely with location.

3. The underside of galvanized sheets on text racks is fairly well protected by a zinc coating.

4. Zinc coatings furnish little protection to steel when moisture accumulates between the sheets in a pile.

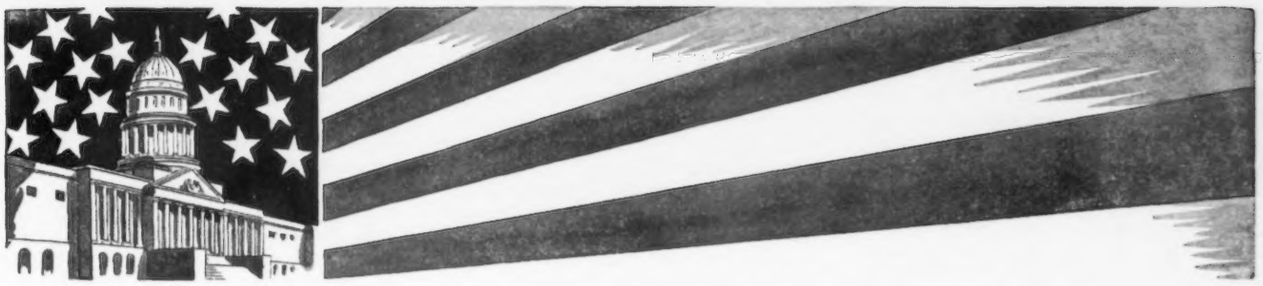
5. Uncoated steel sheets perforate from the underside on test racks.

6. Increasing the thickness of steel sheets apparently increases their life by an amount which is greater than the increase in thickness would indicate.

7. The severity of specific localities on zinc and steel is quite different.

8. When the condensation is high, the condition at the laps is similar to that of sheets wet in a pile and it is there that failure is expected.

As a floor covering for machine operators a folding steel door-mat, such as is used before doorways of the home, is suggested in the March news letter of the National Safety Council. Three distinct advantages claimed for the mat are: Operator's feet are kept off the cold concrete floor; at no time does he stand on a damp surface; there is no tendency to slip.



THIS WEEK IN WASHINGTON

Labor Unrest Threatens Recovery

Demand for Recognition by A. F. of L. Is Grave Concern To Administration—Easier Credit Offers Most Encouraging Development of Week

By L. W. MOFFETT
Resident Washington Editor
THE IRON AGE

WASHINGTON, March 20.—Tense labor conditions are so seriously threatening the recovery program that they are receiving the major attention of the Administration. Strenuous moves are being made to prevent labor and industry from coming to grips, signs of which have appeared with alarming though not surprising suddenness. Industry and labor, as well as the general public, are nervously hoping for settlements that will permit the country to forge ahead with increased industrial activity now that spring is at hand.

Normally, one of the largest production months of the year for steel, March will see the industry seriously crippled unless the shadows are quickly lifted. The immediate danger lies with its greatest single consuming source, the automobile industry. Organized labor's threat to strike and tie up the industry necessarily throws a chill into steel circles. This is only one of the labor blights. Steel shares with the automobile industry the quarrel with organized labor. Union recognition is being vigorously insisted upon by the American Federation of Labor. It has been flatly rejected by both industries, each standing as a unit. Then there is the railroad labor situation. While perhaps not imminently dangerous, the paralyzing effect of country-wide transportation tie-up is readily seen. Negotiations in the railroad situation may be continued for some time. The railroad brotherhoods turned down the railroads' proposal that the existing 10 per cent wage cut be continued until April, 1935, and disregarded the suggestion of President Roosevelt that the present pay be continued another six months. The brotherhoods are demanding that full pay be restored July 1, 1934.

Union Recognition the Issue

But with the automobile and steel industries the issue is recognition of organized labor. Collateral points are involved but recognition is outstanding. Were that granted, wages, hours, etc., would be subjects of collective bargaining by the union with the strong lever of recognition on which to force their demands. These issues center about the source of the present labor unrest—Section 7-a of the recovery act.

The Weirton case is built upon this point and the Amalgamated Association of Sheet, Tin and Iron Workers is driving with growing force in wide sections of the industry. It is endeavoring to use the National Labor Board as its vehicle. Refusal of producers to submit to the board's supervision of elections where previous elections were held by company organizations has stirred organized labor to make charges of coercion of employees, "defiance of the Government," etc.

Only last week the National Labor Board "ordered" an election to be held among the employees of the Thomas blast furnaces of the Republic Steel Corpn. in Alabama. The board proposes to assume supervision. This row was raised by the International Union of Mine, Mill and Smelter Workers, which is affiliated with the American Federation of Labor. The board admitted it had no jurisdiction over the Republic's Raimund iron mine, inasmuch as it is not under the PRA or any code, yet it suggested that a board-supervised election be held at the mine also. At a hearing before the National Labor Board, counsel for the Republic company served notice that its "position is that of the steel industry generally, and we will take such steps as lawfully necessary to uphold the employee representation plan." This is taken to mean that the company also challenges the power of the National Labor Board and is ready to make a test case in the courts.

Steel Code Attacked

The steel industry also has seen its code attacked vigorously along with the general heckling it has received in Washington. Recently the Consumers' Advisory Board made a report which particularly assailed the open price policy and the basing point provisions of the steel code.

Numerous other provisions also were dragooned and if recommendations of the Consumers' Advisory Board were acted upon the code would be stripped of almost everything except Section 7-a and a few trade practice provisions. It is also altogether conceivable that some sweeping changes in price policies in all codes will be made soon.

The Federal Trade Commission is also inquiring into the steel code under the Borah resolution. Restrictions under the independent offices' appropriations act legally prevented the commission from doing any field work in connection with the inquiry but a study of the American Iron and Steel Institute code records were made just the same and the report is based upon this study together with the material the commission already had in its records. A digest of this report which was issued Tuesday, March 20, appears elsewhere in this issue.

General Johnson does not like the commission. He did not acquiesce to the inquiry without first taking a stinging verbal shot at the commission for wanting to snoop into the steel code. But it was so authorized by the Borah resolution. If the first report was toned down, it may have been done partially to avoid extreme manhandling of a code that met with the blessing of the NRA and the President. The opinion prevails that the report may attack the steel code bitterly. The commission, of course, is opposed to the basing point system.

Labor Negotiations Disappoint

The NRA was considerably disappointed at the abortive hearings before the National Labor Board last week when organized labor and automobile manufacturers got nowhere. Organized labor boiled with anger. General Johnson at once took over the case personally and went into personal and telephone huddles with labor representatives and automobile interests, with a proposal for the establishment of a mediation committee.

The frequently challenged National Labor Board did get comfort out of the arrangement by General Johnson to settle the case of the Budd Mfg. Co., Philadelphia, long a matter of sharp dispute with the board. The settlement is of doubtful value to the board itself, however, inasmuch as the election ordered at the Budd plant for today is to be under the supervision of George Buckley, special assistant to General Johnson, and in no official way connected with the board. Under the terms of the Budd election, to be held outside the company's plant, men who went on strike last November will be permitted to vote. They are members of the United Automobile Workers' Federal Union. In his notice of the election General Johnson took occasion to praise the Budd Company for its support of the NRA and its "attempt to comply with the law." The present conditions were attributed to "a series of misunderstandings in good faith." Also General Johnson said the company has indicated to him that an employee representation plan is desired by the majority of workers. The Administrator said that the present plan of employee representation will continue unless a majority of the men whose names are on the lists—those employed at time of the strike last November and on the payroll March 15—vote for the Automobile Workers' Union.

Wagner Bill Assailed

Meanwhile the Wagner and Connery bills are drawing the fire of employers, including those in the automobile and steel industries. The Wagner bill hits vitally at these two industries inasmuch as it would eliminate company unions. It would also establish a permanent National Labor Board with broad powers to enforce its decisions. The fact that this measure was introduced and the provisions it contains are taken by implication to be an acknowledgment of the lack of power by the present National Labor Board. Neither the Wagner nor the Connery bill has been indorsed by the President and his attitude toward them is not known. It is certain, however, that Secretary Perkins and General Johnson oppose the Connery bill, considering its terms too drastic. However, Miss Perkins has indorsed the Wagner bill and it is probable General Johnson will do likewise. It is suspected that the President shares the same views. In view of the temper of Congress either the Connery or Wagner bill could be passed and put up to the President, who is said to be greatly disturbed over the threat to the recovery program offered by the labor situation. The Administration apparently looks favorably upon both bills at least for trading purposes—as clubs to enforce better industry-labor relations and the shortened-hour-increased-wage program.

Credit Program Offers Hope

A cheerful aspect of the situation is the new credit policy the Administration is pushing as a means of aiding industry. Inasmuch as it contemplates long term paper it has been hailed as of promising character for the capital goods industries. It may be a partial answer to the study of the capital goods committee selected by General Johnson to map out a program for recovery.

The credit program is somewhat confused. Yet with President Roosevelt and Secretary Morgenthau recommending one laid before the Senate and House Banking committees by Governor Black of the Federal Reserve Board, it plainly has more support than the RFC plan proposed by Chairman Jesse Jones. There seems to be a conflict between the Federal Reserve Board and the RFC as to which will sponsor the program. The Federal Reserve plan proposes the extension of long-term Government credit to private industry through regional banks in each of the 12 Federal Reserve districts with a capitalization of $140,000,000. Loans could be made either direct to industry or through banks, the latter guaranteeing 20 per cent of the amounts. Governor Black has said $300,000,000 would flow at once into industry. Original capital for the banks would be financed by the Treasury from gold devaluation profits and banks also would be authorized to issue debentures in order to get increased capital. Mr. Jones contends the RFC plan does not conflict with the Federal Reserve plan but is only a clarification of the RFC's present power. Those taking issue with him claim the Jones plan would greatly broaden the power of the RFC in making loans. In the past also Mr. Jones has opposed direct loans by the RFC to private industry, though later agreeing to the mortgage company plan which has proved cumbersome and not very effective in aiding small industry.

Birmingham Steel Code Meeting Scheduled

A MEETING for members of the iron and steel code in the Birmingham district at Hotel Tutwiler, Birmingham, March 22, has been announced by Walter S. Tower, executive secretary of the American Iron and Steel Institute. The meeting will be similar to those held recently in Chicago, Cleveland, Pittsburgh and New York, for the purpose of explaining and interpreting any points of the terms and provisions of the iron and steel code which members may want to have cleared up for them. Attendance at the meeting will be limited to accredited representatives of members of the code. Mr. Tower will preside at the meetings and answer questions of the members.

Laclede Steel Co., and subsidiaries, St. Louis, had net loss of $40,483 in 1933, compared with loss of $110,206 in 1932. In 1933, $204,332 was charged off for depreciation and obsolescence. Current assets totaled $1,878,558 on Dec. 31, 1933, including cash, $356,615; receivables, $427,230 and inventories, $1,092,117. Last year the company spent $165,943 for improvements, chiefly for a new department manufacturing wire and allied products.

Automobile Industry Denounces Wagner Bill As Unfair

DETROIT, March 20.

DECLARING that it would unionize every industrial worker in the country, regardless of his wishes, would set up a labor dictatorship with power and authority exceeding anything yet experienced in the United States, and would result in giving labor union officials virtual domination over American industrial life, the National Automobile Chamber of Commerce, representing all motor car manufacturers except the Ford Motor Co., has issued a statement vigorously denouncing the proposed Trade Disputes Act, popularly known as the Wagner Bill.

Higher prices, constant labor trouble, strikes and lockouts would be the inevitable consequences of the enactment of this bill, states the chamber. It declares that it is joining forces with the steel industry in seeking to keep the automobile and steel industries out of the hands of organized minorities which have interests to serve other than those of employees and employers.

"Even during the World War," says the statement, "when unions reached their greatest strength, union labor organizers were able to enlist less than 10 per cent of the gainfully employed workers in America. Such organizers are now trying to legislate men into unions, to set up so-called organized labor as the overlord of all American labor, in a position to extract dues from present nonmembers by coercive methods and interested primarily in perpetuating the jobs of a labor bureaucracy."

A foretaste of what may be expected if the Wagner Bill is enacted into law was experienced in Detroit last fall when a few thousand tool and die makers on strike delayed the start of production on 1934 models about six weeks, points out the chamber. These few thousand on strike cost six weeks' pay to nearly 200,000 other productive workers in the industry. Each man on strike cut into the incomes of about 30 other innocent men at a time when those men needed a pay check badly.

Seniority Rule Removes Individual Incentive

Emphasizing that under the proposed bill seniority would be the determining factor in advancements, the chamber states that one of the reasons the automobile industry has been relatively free from labor disputes is because it has always paid higher wages than other major industries and because, wherever possible, promotions have been made from within the ranks. The men know that if they do their work well they will be moved up at the first opportunity. The seniority clause of the Wagner Bill removes this incentive and destroys one of the cardinal principles upon which successful management is based.

"The automobile industry believes that there should be placed upon labor unions a responsibility and regulation equal to that already placed upon business," declares the chamber. "Today we have a tendency toward nationalization of business and industry under rigid control and an effort to organize labor on a nation-wide scale with no control or responsibility whatsoever.

"National labor unions without a semblance of regulation from any quarter, if they could organize American workers, would have an annual income of close to a billion dollars. It is fair to assume that the public, when it knows the facts, will demand for its protection the same measure of regulation applied to labor unions as is applied to business."

Wage Rate Now Above 1929 Level

The chamber points out that the automobile industry was among the first to agree upon a code complying with the National Recovery Act and that it has made frequent upward wage adjustments and shortened hours in accordance with Administration recommendations until today prevailing wage rates are above 1929 and weekly earnings are within 10 per cent of the all-time high.

Concludes the chamber's statement, "Mindful that in times of great national emergency abuses inevitably appear, the National Automobile Chamber of Commerce unanimously opposes the Wagner Bill as unreasonable and unfair. The automobile industry urges every voter who eventually will have to pay for these abuses to get into immediate touch with his Senator and Congressman at Washington and urge them to vote against such destructive legislative proposals."

Industrial Conference Board Reports February Gains

GAINS of more than seasonal proportions in industrial production, primary distribution, and retail trade are reported for Feb. and the first half of March in the current monthly report of the conference of statisticians in industry of the National Industrial Conference Board.

Basic industries showing substantial advances in production were automobiles, steel and iron, bituminous coal, and electric power. Building and engineering construction, alone of the basic industries, declined. This was due to weather conditions and a let-up in publicly financed contracts. Privately financed awards declined only slightly. Publicly financed construction in Feb. was 2½ times as large as privately financed, having declined from 5 times as large in Jan. In the first 8 months of 1933 public awards were only have as large in dollar value as private. In Sept. publicly financed operations moved ahead of privately financed awards and became increasingly larger until Jan., 1934.

Prices of commodities at wholesale advanced in Feb. and held steady in the first half of March. In the second week of March commodity prices were 0.1 per cent above the level of the middle of Feb. and roundly 24 per cent above the 1933 low in Feb. In recent weeks farm products and foods at wholesale showed the largest advances. Metals and metal products, building materials, chemicals and drugs, and miscellaneous commodities showed slight gains. Hides and leather products, fuels, and lighting materials showed slight declines in recent weeks.

The cost of living moved up 1.0 per cent in Feb. over the Jan. level and was 8.6 per cent higher than in Feb., 1933. The advance during the month was due to substantial increases in food prices and moderate advances in rents, clothing, and sundry items in the wage-earner's budget. Coal prices at retail declined slightly.

Commercial failures declined more than seasonally in Feb. as compared with Jan. The number of failures fell roughly 23 per cent, and the dollar value of liabilities incurred declined 41 per cent. While comparisons with a year ago must be viewed in the light of a prevalent view that weak concerns are now being carred by banks to a greater extent, the number of failures in Feb. was 56 per cent under last year and 64 per cent under the high in Jan. last year, and liabilities incurred were 70 per cent under the total of Feb., 1933, and 75 per cent under the high in Jan. last year.

Orders booked in February by the Baldwin Locomotive Works, Philadelphia, were the largest in any month in nearly three years, having amounted to $2,336,000, as compared with $1,920,000 in January and with $476,000 in February, 1933.

President Intervenes to Halt Auto Strike

By BURNHAM FINNEY
Detroit Editor, The Iron Age

ON the verge of what William Green, president of the American Federation of Labor, has threatened will be one of the greatest strikes in the history of American industry, President Roosevelt has intervened to secure postponement of a tie-up. This came in the form of a telegram sent to William Collins, A. F. of L. organizer, in Detroit on Tuesday afternoon, which read as follows: "In the public interest, I am constrained to request you to withhold strike action called for this afternoon until I can have a conference in Washington in an effort to reconcile existing difficulties. I suggest Thursday. Will you please advise me immediately."

William Green, president of the A. F. of L., is also reported to have wired a message to union officials in Detroit strongly urging acceptance of the President's request. Under these circumstances, the possibilities of drastic action before next week seems remote, unless the radical element gets out of hand and chooses to disregard these powerful interventions.

One strike, however, is already in progress, having started Tuesday morning at the plant of the Bower Roller Bearing Co., where 1000 employees are said to have walked out in demand of union recognition. This company has large contracts with Ford and Plymouth.

Presidential intervention in the Detroit situation was made necessary by the inability of the automotive authorities to comply with the union ultimatums after a two-day consideration of them in New York. However, the manufacturers agreed to the President's request and proceeded to Washington Tuesday night for a conference at the White House on Wednesday.

The automobile industry is firmly convinced that it must resist further encroachments by organized labor or surrender the right to operate its own business. Its position is tersely summarized in a statement of the National Automobile Chamber of Commerce to the effect that "the automobile industry has reached its present state of high efficiency and low cost with the consequent wide demand for its products, high wages and plentiful jobs without the help of the American Federation of Labor and without any serious labor trouble. Unasked and unwanted the American Federation of Labor is now trying to get control of this industry and destroy what we have taken years to build. This industry does not intend to yield to such un-American and unpatriotic procedure." The feeling on the part of the entire industry is that it has cooperated wholeheartedly with the Roosevelt administration in increasing wages, cutting hours and living scrupulously up to the requirements of the National Recovery Act and that it will continue to cooperate in these matters but it cannot and will not recognize as the spokesman for its employees in collective bargaining an organization which admittedly has only a minority of automobile workers in its ranks and which has been able to make progress in unionizing a traditionally open shop industry only because of direct and indirect help from a pro-labor administration at Washington. The A. F. of L. on the other hand is fully cognizant of the fact that it now has its one real chance of gaining a permanent foothold in Detroit and if it fails to take advantage of the situation it might as well admit its impotency and give up the fight. The Federation, moreover, has either intentionally or inadvertently advanced so far along the automotive front that an orderly retreat now is considered impossible. It must go on to success or failure risking all on a strike. Thus both sides in the pending struggle are convinced that a compromise is impossible and that the only thing left is a contest to determine their respective strengths.

Although the A. F. of L. does not admit that it must have a majority of the employees in a plant within its ranks in order to act as their agent in collective bargaining it is ordering a strike only in plants where it is sure of a substantial majority. A number of unions in companies aside from those on which definite demands have been made already have voted to answer the strike call and all of the 80 local automobile unions are being canvassed. In each case the union is being asked by Federation officials to decide on strike action solely on the basis of whether it is strong enough to win its own plant. There is little doubt that if the strike gets under way it will spread rapidly to practically all plants in the industry with the exception of the Ford Motor Co. and may extend into other industries, particularly the steel industry. Unofficial spokesmen for the Federation charge that the decline in weekly maximum hours announced by the industry last week is without meaning because the automobile code still permits employees to work 48 hours during the rush season. All that the cut in hours signifies is that when the time comes to average the hours for the year after the peak period has passed plants will run part time or shut down longer than they would have done otherwise. The Federation in its demands for plant elections under Governmental auspices is insisting that in the balloting an employees' union affiliation shall be designated so that the workers will know whether they are voting for an A. F. of L. or a company union man to represent them. In support of this contention, the Federation cites the fact that candidates in a political election have their party connection shown on the ballots. The main issue, says the Federation, is not whether John Jones is to be elected because he is John Jones, but because he is a Federation or non-Federation man. Officials of the A. F. of L. have given serious thought to calling a strike only in General Motors and Hudson plants, believing that the two companies involved would be much more willing to make a favorable settlement quickly if they knew that Chrysler and other manufacturers were still able to make and sell cars. However, this plan has been abandoned because of the feeling that it wouldn't work due to the rapid spread of the strike fever and the impossibility of holding Chrysler employees on the job. It is freely admitted here that thousands of men will quit work because of their sincere conviction that in so doing they are supporting President Roosevelt in his efforts to make a defiant industry obey section 7a of the National Recovery Act. These men also know that in case of a strike they will receive relief funds from the Federal Government if they are in need.

Harry L. Hopkins, Federal Relief Administrator, is quoted today as saying that "it is not our purpose to judge the merits of the strike. Members of families of strikers will be given relief according to their needs." One observer who has dealt intimately with labor over a period of years draws the conclusion that collective bargaining and unionism are new experiences to a majority of automobile workers and they have a sort of war hysteria attitude toward a strike. He believes that the A. F. of L. recognizes the weakness of its position from the standpoint of high wages and satis-

factory working conditions and therefore its principal weapons will be charges of discrimination against union men and a demand for union recognition. The Federation likewise knows that its strong second line of defense is the Wagner bill and in a strike it will utilize every opportunity to demonstrate the need for this legislation. It is reliably reported that membership in the Federation's automobile union has increased considerably in the last two weeks because of agitation by union organizers and because of the apparent indorsement of organized labor at Washington. Moreover, sympathies of employees toward unions have grown markedly in that period. Detroit is convinced upon the outcome of the labor crisis centering here depends to a large extent on the Administration's future recovery program and its attitude toward both labor and industry. The fact is conceded that General Johnson and with him the entire NRA probably stand to win or lose on happenings in the next few days. Of course the sight of Henry Ford sitting serenely by and not being drawn into the labor whirlpool is anathema to the General. Mr. Ford seemingly is in the enviable position of being the only manufacturer in the automobile industry whose production and sales will not be affected by the strike.

Department of Justice Files Suit Against Weirton Steel Co.

SUIT filed today in the Federal Court at Wilmington, Del., by the Department of Justice against the Weirton Steel Co. brings to a head the first and long expected test of the collective bargaining section of the National Recovery Act. Inasmuch as the American Iron and Steel Institute as the code authority has declared its purpose to support the Weirton Steel Co. in its contention with the National Labor Board the suit is held to be equivalent to a proceeding against the entire steel industry. It comes upon the heels of a stinging report by the Federal Trade Commission against the steel code and at a time when the strike situation in the automobile industry over the collective bargaining section is extremely serious.

This series of Government moves has visibly created a deep stir and grave concern as it may halt the entire recovery movement. The Department of Justice bill, signed by Attorney General Homer S. Cummings, and Leonard E. Wales, United States Attorney for the district of Delaware, is based upon provisions of the National Recovery Act and charges the Weirton Steel Co. with violating the act, the steel code, its agreements with other members of the steel industry to comply with the code provisions and with the President's executive order of Feb. 1, 1934, providing for conduct of elections at Weirton plants by the National Labor Board. The bill asks for an injunction restraining the company from violating section 7a (collective bargaining section), from discharging, laying off or changing conditions of employment of employees on account of union affiliations, referring to those of the amalgamated association of sheet, tin and iron workers, and from interfering with an election conducted by employees. The bill also asks for an order requiring the company to file with the court identification lists of its employees and such other documents and records as may be necessary for the conduct of an election. Request is also made for an order reinstating those employees who, it is claimed, were discharged or refused employment because of their union activities or relations.

The Labor Board's attempt to conduct an election in December in accordance with the terms of this agreement is cited and the refusal of the Weirton Steel Co. to permit the Board to conduct such an election and the "various acts of interference on the part of the company with the self-organization and designation of representatives of its employees." These various acts of interference are summarized in paragraph 12 of the bill. The bill also describes the issuance of the Presidential order providing for the conduct of elections by the National Labor Board and charges the company with interference with the attempts of the National Labor Board to carry out this order. The company is charged with refusing to furnish the National Labor Board with a list of its employees and refusing to permit the representatives of the board to conduct a poll on company premises.

The Government charges the company with coercing employees to join the company union and says it circulated among its employees copies of letters from its customers canceling orders or threatening to cancel or to withdraw business in case the Amalgamated should prevail. It also charged that the company imposed membership in the company union and non-membership in the Amalgamated as conditions of employment and that no opportunity was given employees to elect representatives to act for them under any plan other than the company union. It is declared to still be the desire of a substantial number of employees that an election be held immediately under the supervision of the National Labor Board but that the company is preventing such action. Immediate and appropriate relief is sought by the Government.

Sellers to Government Must Comply With Codes—Industries Reduce Hours

WASHINGTON, March 20.—Growing complaints of violation of the National Recovery Act apparently prompted an executive order by President Roosevelt which requires bidders for Government contracts and contracts financed by Federal funds to sign certificates of compliance with codes. In the absence of codes such certificates showing compliance with the President's Reemployment Agreement must be produced. So tightly drawn are the terms of the order that if literally applied they could set up a boycott against certain bidders. The order carries added significance when considered in connection with the intensified efforts of the Administration to enforce provisions of section 7-a of the recovery act over which there is sharp difference between labor and industry. Organized labor is hotly contending that this section, relating to collective bargaining, is not being complied with, while industries just as earnestly declare they are living up to its provisions.

It has been declared that one purpose of the order is to strike at the Ford Motor Co., on the charge of noncompliance with the automobile code. However, the Ford company, while not a signer of the code, has been given a clean bill by Controller General McCarl, and Ford dealers have been awarded Government contracts. It is therefore difficult to see how the company would be affected by the new order unless, in common with other concerns, it would be held to be violating the collective bargaining section. It remains to be seen whether the order will develop disputes over

this section along with other provisions of the recovery act.

Bids Require Code Compliance

The order also provides that all invitations for bids issued by Government agencies must require that certificates of compliance with codes or agreement to abide by the PRA accompany bids. A further provision forces contractors making subcontracts to get materials only from those who have certified their compliance with codes or agreed to adhere to the PRA. These provisions apply to all contracts financed by the United States Government, whether Federal, State or municipal. An automobile manufacturer, for instance, in fulfilling a contract would be required, if he had his bodies built for him, to have them constructed only by the builder who could supply a certificate of compliance. A maker of sheets would have to see to it that the sheet bar manufacturer from whom he purchased semi-finished steel could furnish a certificate of compliance. The provisions, however, do not restrict materials to those purchased in this country and do not require price differentials in favor of such materials.

Penalty for falsely certifying code compliance is set at a fine of $500 or six months' imprisonment, or both, with the contractor liable for any expense occasioned by cancellation of contracts. Any disputes between the Government agency and a contractor are to be submitted to the National Recovery Administrator or such agency as he shall designate, the decision reached to be final. The order allows specific exceptions in cases where the administrator believes "justice or public interest will best be served thereby," a rather broad provision.

Corrugated Metal Culvert Code Heard

Hearing was held last week on the code for the corrugated rolled metal culvert pipe industry, the code being submitted on behalf of the National Corrugated Metal Culvert Pipe Association by its president, E. B. Abbott. The code authority would consist of five members, as follows: Mr. Abbott of the Newport, Ky., group; S. R. Ives of the Armco group, Middletown, Ohio; F. A. Kelly of the Toncan group, Youngstown; J. H. Robinson of the Wheeling, W. Va., group, and Alex Bruce, Fargo, N. D., of the independent group.

Mr. Abbott claimed that the code authority proposed represents approximately 75 per cent of the industry, which is composed of 99 companies controlling 137 plants. He also claimed representation of approximately 90 per cent of the dollar volume of business.

Packaging Machinery Group to Shorten Hours

The code authority for the packaging machinery industry has informed the National Recovery Administration of the industry's intention of adopting a 30-hr. work week for common labor and of increasing its rate of pay to 50c. from 40c. an hr. Members of the canning and packing industry also joined the schedule. Also responding to the President's request for reduced hours and increased pay were the refractories and automobile industries.

Pipe Nipple Code Authority

General Johnson has approved the selection of industry members of the code authority for the pipe nipple manufacturing industry as follows: R. B. Shoe, Jersey City, N. J.; J. L. Williams, Chicago; W. V. Daugherty, Burlington, N. J.; E. W. Krause, Wheeling, W. Va.; E. H. Young, Pottstown, Pa.; George Keipper, Jr., Buffalo; William France, Pittsburgh.

Opposition to Wagner and Connery Bills

(*Concluded from Page* 36)

with increasing alarm by the professional leaders of national labor unions as a menace to them.

We also call your attention to the significant fact that the provocative threats of invoking the greatest strike in history which would result in utterly destroying all progress that has been made toward national recovery are emanating from this same small group of paid union leaders while these two bills are before you and that if by intimidation they step into the unrestricted power provided for them in these two bills we will have not merely a government by national labor leaders but an actual labor leader dictatorship with everything which that implies of destruction to this splendid nation that stands at the head of all nations in progress and opportunity.

We finally request that you consider carefully the statement issued by the American Iron and Steel Institute on March 14 and similar statements issued by the National Association of Manufacturers against this legislation.

Your attention is respectfully called to the fact that among the iron and steel manufacturing companies whose signatures follow are those whose works and properties are within your constituency.

Vigorous protest against the passage of the Wagner bill was adopted and telegraphed to Washington at a meeting of operating executives of 24 steel companies held in Cleveland, March 19. These executives represented steel plants in Ohio, Northwestern Pennsylvania, West Virginia and Kentucky. The protesting telegram states that steel orders have already fallen off as a result of the uncertainties and hesitancy that have resulted from the threat to pass the Wagner bill.

Iron and steel companies of New England, New York, Pennsylvania, New Jersey, Delaware and Maryland met Monday of this week to discuss the Wagner and Connery labor bills and sent the following telegram to their Congressional representatives:

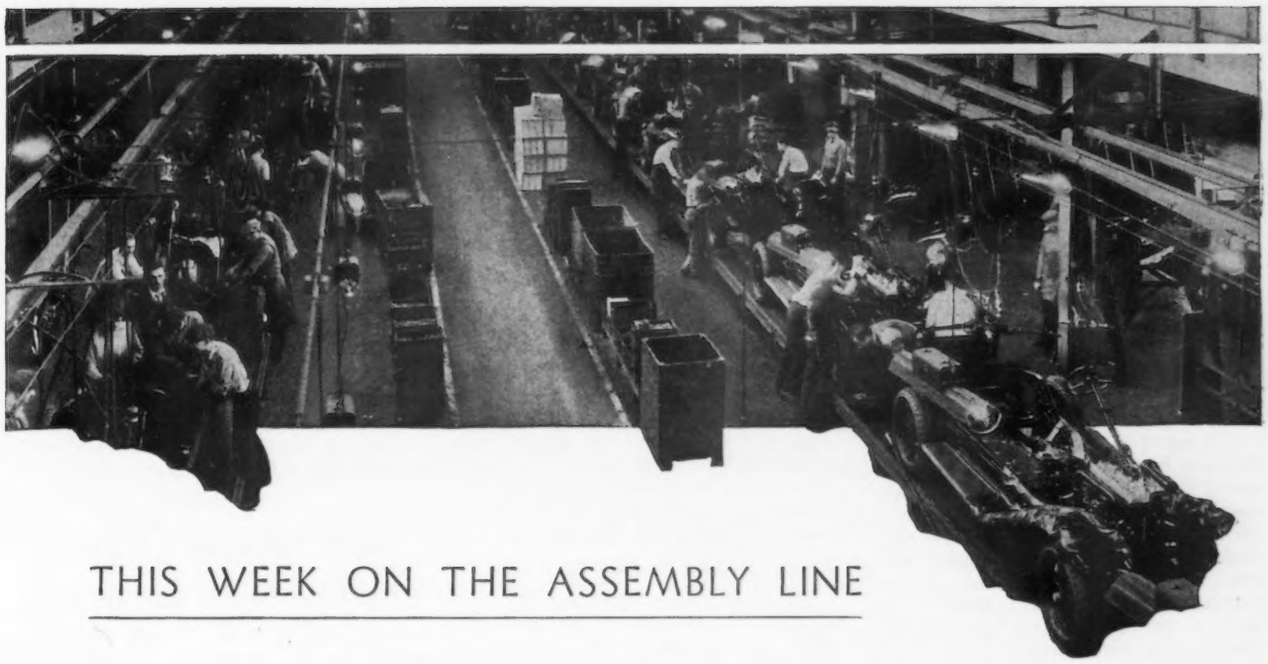
As property owners, taxpayers and employers of thousands of workers the interests of all of whom are also deeply concerned, we call attention to the dangerous features of these bills. Should they become law American workers would be saddled with a dictatorship of union leaders which the workers have not sought and by such law they would have forced upon them a condition which they have declined voluntarily to accept. A group of union leaders who cannot properly claim to represent more than 10 per cent of American workers are seeking by such legislation a union monopoly. Reliance on the Recovery Act, its interpretation by the courts and especially the desire and manifest ability of labor and industry if unhampered to reach a common accord are preferable to the imposition of a dictatorship of union leaders. Already the menace of the Wagner and Connery bills hanging over business is resulting in slowing down industrial activities at the very season when normally they would be accelerated. The consequences of the passage of these bills would be extremely far reaching against the interests of the country the welfare of which depends upon the fostering of cooperation by labor and management in the joint enterprise of industry. The proposed measures hark back to the old discredited idea that interests of employees and employers are antagonistic. Such legislation would array class against class, foment general discord, destroy existing harmonious relations and block progress toward recovery. We most strongly urge that you oppose the passage of these bills.

Political Implications Dangerous

Congressional reaction to both the Wagner and Connery bills is practically unknown in Washington today. The President has committed himself on neither of these pieces of legislation and the opinion persists that definite ideas are being withheld pending the results of the negotiations with organized labor which are now under way. However, it is thought in some circles that the members of the House of Representatives would vote in favor of either one of the bills in view of the approaching elections and that Presidential veto would be the only restraining influence. Opinion in the Senate is not so clearly defined, but sponsorship of the bills is influential and might wield considerable weight.

The opposition of the steel and automotive industries is not calculated to carry much weight in Washington at the present time. While the objections to the bills have been carefully thought out and given wide dissemination in the industries affected, the public has certainly not been properly informed regarding the implications of the legislation.

During the next fortnight the committees of both houses will give careful consideration to both the Wagner and Connery bills. The opposition of the steel industry is expected to involve considerable testimony and will have the full support of the investigational facilities of the American Iron and Steel Institute.



THIS WEEK ON THE ASSEMBLY LINE

High Production Pace Maintained Despite Strike Threat

DETROIT, March 20.

UNDER the shadow of a threatened strike of its workers, the automobile industry has not slackened its production pace. Retail demand is so strong that practically all companies are exerting every effort to turn out as many cars as possible this month. Ability to secure parts in sufficient volume continues to be the limiting factor. Chrysler Corpn., cramped for manufacturing space, has rented part of the plant of Continental Motors and is making body parts there for its Chrysler and DeSoto lines. The Dodge division is understood to have taken some space in the Packard plant as a temporary expedient to expand operations.

The possibility of a strike has cut down steel releases, although substantial orders placed by the Chevrolet Motor Co. for its local gear and axle plant and its Flint plant for April delivery helped sustain the volume the past week at a fairly high level. The Ford Motor Co. is expected to make its monthly steel buy this week. However, there is a lack of buoyancy to the steel market here which is traceable directly to the fear of impending labor trouble.

In the case of certain parts makers, the strike threat has brought in orders for rush delivery which earlier had been scheduled for production 30 to 60 days from now. Even among motor car manufacturers the desire is widespread to get into their plants as quickly as possible whatever steel has been ordered rolled by the mills. Many factories in this district worked without interruption over the week-end apparently with the end in view of completing as many units as possible before the strike storm breaks. If it doesn't break, they are that much farther ahead anyway, so nothing is lost.

Manufacturers Are Not Storing Cars

There is no truth, however, in the reports circulated in this district that automobile makers are building cars and warehousing them in anticipation of a strike. In the first place, retail sales have been so brisk that they haven't had an opportunity to do that if they wanted to. Secondly, it is considered doubtful that they would gamble much money at this time on such a program. Finally, the storage of a large number of cars is looked upon by the industry as impracticable. Several manufacturers have had sad lessons along this line in previous years.

Chevrolet has increased its production by operating six days a week instead of five. It still is assembling approximately 4000 units a day, and will end the month with a total output of about 100,000 units as planned. Oldsmobile has stepped up operations on its six-cylinder car. Buick will start to build its new light eight about April 1. Two days the past week all of the General Motors car divisions made 6000 units a day. This means that Chevrolet assembled 4000 cars a day and the other divisions—Pontiac, Buick, Oldsmobile and Cadillac-La-Salle—only 2000.

Ford is maintaining a rate of about 4000 units a day at the Rouge plant, five days a week, and will easily attain its goal of 83,000 units in March. Plymouth is holding to a level of about 10,000 cars a week, a figure equal to the plant's capacity. Dodge has managed to push its output still higher and may show 17,000 units for the month.

Assemblies of Airflow Cars Increase

Assemblies of the Chrysler and DeSoto Airflows have increased to 250 to 300 units a day. However, in the case of DeSoto it is reported that dealers cannot make deliveries in less than four or five weeks.

Unless a strike occurs, March production should be at least 325,000 units, and April should bring an expansion to the 400,000 mark. First quarter assemblies will be approximately 725,000 units, compared with 368,106 units in the corresponding quarter of last year.

It is the general belief in automotive circles that the production peak this year will not come until May and possibly not until June. Even though the peak should be in June, the industry expects to experience no sharp decline in operations through July and August, thus repeating the performance in the summer of 1933.

Makers Introducing New Models

With the spring season near at hand, many manufacturers are about to introduce new models. Ford is rounding out its V-eight line with a Victoria model which goes a step farther in streamlining than previous Ford cars. This model, however, does not approach a design as radical as the Airflow models of Chrysler, although reports have been persistently published to the effect that the Victoria would go the full length in stream-

lining: It can be stated with authority that the Ford management is not yet sold on the practicability of a radically streamlined car, even to the extent of having one model in its series of that design.

Plymouth has announced its Standard car with conventional front axle. Chevrolet will shortly put its Standard series on the market. Buick will make its debut in the $750-$800 field by May 1, with its small straight eight with valve-in-head engine of new design. Auburn is preparing to enter the lower-price market in the coming months, although the debut of its small car may be later than expected.

The story is heard in Detroit that Packard has an engineering staff engaged in designing a light car which may be presented this year to give Packard dealers a wider market for their activities. A rear-engine car may appear before the end of the year. William B. Stout is working on such a car at present. Production would be in very limited volume.

It is admittedly too early to judge accurately the public's reaction to the Airflow type of car, but from what information is now available the odds favor its acceptance. If this proves true, it will have a profound effect on 1935 designs, and probably will be reflected in models which may be presented long before the present year is out. The three developments which seem near at hand are extension of independent wheel suspension to the rear as well as the front of cars, streamlining after the fashion of the Airflow models, and automatic transmissions.

Investment and Improvement

It is no secret that with the return of better business the managements of the larger automobile companies are willing to make generous capital expenditures for model changes, whereas for several years they have tried to economize as much as possible. This promises well for the machine tool industry, except for the fact that the outlook is clouded by the troublesome labor situation. Just now one manufacturer which is contemplating a very large tooling program is doing nothing to develop it until labor conditions become more satisfactory. Even if the current strike threat is dissipated, this company feels that it cannot risk going ahead with the expenditure of several million dollars unless some assurance is given that union labor leaders will not try to disturb the existing structure in the industry every few weeks. Present labor difficulties have had the effect of temporarily freezing the market for machine tools at Detroit and a thawing out of this lucrative trade is directly dependent on a permanent rather than a momentary solution of the present controversy over collective bargaining precipitated by the American Federation of Labor.

Changes in plans occur so frequently these days that a prediction of what may happen three or four months hence is risky. However, there is a possibility that one manufacturer which formerly announced yearly changes in midsummer may go back to this practice this year. At least tooling plans which give a strong hint of what lies ahead point to such action.

Until some of the present uncertainties, particularly the relationship with labor, are cleared up, motor car manufacturers are satisfied to let out work to suppliers rather than expend their own facilities. All three of the leading makers — General Motors, Ford and Chrysler — are giving more contracts to outside firms than in several years. It is understood that Plymouth is having some of its crankshafts forged in an outside shop.

Chrysler Cramped for Room

Chrysler Corpn., incidentally, is in a tight predicament. Although the industry has ample capacity to build two and a half to three times as many cars as will be made in 1934, Chrysler has expanded so rapidly in the last two years that it finds itself cramped for quarters. It is today prodding on its various car divisions to turn out units at their utmost capacity, yet it finds difficulty in keeping pace with retail sales.

This situation has given rise to many reports regarding Chrysler's future plans. One is that it may acquire part of the manufacturing plant of the Willys-Overland Co. at Toledo and possibly the Willys subsidiary at Pontiac, the Wilson Foundry & Machine Co., which builds all of the Willys engines. That the Wilson foundry may be the beneficiary of Chrysler orders is probable. That it might be purchased by Chrysler would seem to depend partly on whether the price was low enough.

Automotive steel buyers have not finished trying to figure out ways and means of protecting themselves against price declines and price advances. It is reported that one user has drawn up a proposed contract for submission to steel suppliers which is clearly in violation of the steel code. No steel company could sign it if it wished to. It is pointed out by steel mills that a contract actually is superfluous under present arrangements, but apparently the automobile company wishes to have a steel contract for its own particular purposes. However, it never will get one along the desired lines unless the steel code is modified.

Unless an unexpected change occurs during the final 10 days of the month, pig iron shipments to the automobile industry during March will be double those in Feb. It will be recalled that pig iron users stocked heavily in Dec. prior to expiration of low-price contracts. The result was that Jan. shipments dropped to a low point. Feb. was somewhat better than Jan., but the volume still was far from normal. Apparently foundries now have eaten well into stocks, as releases for immediate shipment have been high.

Because of the prolonged and severe winter which has brought four feet of ice in the Upper Lakes, it may be as late as May 15 before boats can get into the Buffalo harbor. When the ice breaks up and floats down through the lower lakes it backs up into Lake Erie above Niagara Falls, causing a jam which keeps the Buffalo harbor blocked. This means that water transportation of scrap into Buffalo and of steel and pig iron out of Buffalo to Detroit, Chicago and other Lake ports probably will be delayed this year.

Gen. Johnson Orders Poll of Budd Employees

WASHINGTON, March 20. — National Recovery Administrator Hugh S. Johnson today ordered a poll of employees of the Edward G. Budd Mfg. Co., Philadelphia, to be held today.

Formal announcement of the poll was made in the following statement issued by the General:

"I regard the Budd matter as most unfortunate, and I think that Mr. Budd has acted in complete good faith; that the present condition is due to a series of misunderstandings in good faith; that Mr. Budd especially has supported NRA, and attempted to comply with the law. From reports of this organization, it is indicated to me that there is the employee representation desired by a majority of the men.

"I am not convinced, however, that in arriving at this state of the law, all employees have been accorded to the letter their full rights under the statute, and to purge the situation of this condition, and permit this much needed production and employment to proceed, I suggest that:

"1. There be a published announcement of an election on March 20 at a proper place outside the Company's plant.

"2. The election will be held by my representatives.

"3. The Budd Company will in nowise interfere. After the election it will furnish certified lists of names and signatures of:

"(a) Men employed at date of Strike (Nov. 13, 1933), who are not now employed.

"(b) Men on the payroll as of March 15, 1934.

"4. After the election, my representative will check the ballots against these lists and throw out all ballots of men not on certified lists.

"5. The present plan of employees representation will continue unless a majority of the men whose names are on the lists vote affirmatively on the following question:

"Do you favor the United Automobile Workers' Federal Union No. 18763 to represent you in Collective Bargaining?"

Course of Steel Production Hinges On Outcome of Labor Crisis

Rate Unchanged at 48½ Per Cent; Immediate Future Depends on Success of President's Efforts to Avert Automobile Strike

THE labor crisis in the automobile industry finds steel production undiminished. While new business from the motor car builders has dropped materially, shipments against past commitments have held up surprisingly well. Whatever recession in demand is traceable to the difficulties confronting the automotive trade has been offset by heavier orders from the railroads and other sources.

Failure of Presidential intervention to avert a clash between organized labor and the automobile industry might be followed by rather general suspension of steel shipments to motor car makers, with resumption dependent on the severity and duration of the strike. The plan of attack of the American Federation of Labor is to order strikes only in plants where it believes it has a majority of the employees within its ranks. But there is little doubt that if the strike should gather momentum it would spread to other plants, with the possible exception of the Ford Motor Co., and might finally extend to other industries, including steel.

MEANWHILE steel production is unchanged from a week ago at 48½ per cent of capacity. The Chicago rate is off two points to 47 per cent of capacity, but operations at Pittsburgh and in the Philadelphia district have risen one point each to 32 and 34 per cent respectively. Output in other centers is holding at recent levels.

Finishing mill operations have been more sensitive to current labor difficulties than raw steel output. Sheet mill schedules have been revised downward to about 55 per cent, chiefly because of the receding specifications from the automobile industry, and strip mills have been similarly affected. Tin plate production has dipped five points to 75 per cent of capacity, but a fresh flow of releases may soon wipe out this loss. Undoubtedly can makers have been accumulating stocks as a protection against possible labor trouble in the tin mills later in the year. Existing agreements with the Amalgamated association expire July 1 and a strike at that time would fit in with tin mill operatives' distaste for work during the hottest season of the year.

THE labor threat is coloring the market picture in other directions also. The present wage agreement with bituminous coal miners, which calls for a 40-hr. week, will expire April 1. Demands are now being made by labor groups for a 32 or 35-hr. work week, with a 10 per cent wage increase. These changes, it is estimated, would raise costs at least 20 per cent. Coal shipments in the Pittsburgh district are already showing a gain, suggesting the building up of stocks as a protection against a possible interruption of output.

Higher fuel costs would, of course, affect steel costs, and this consideration is even now influencing the policy of certain steel consumers, who are placing second quarter contracts for plates, shapes and bars and other materials. The volume of this buying has received less attention than it deserves because of the large gap left by the suspension of forward covering by the automobile industry.

SIZABLE releases of car roofing sheets by the Pennsylvania Railroad have partly offset the decline in sheet business from motor car builders. Rail orders continue to cut a larger figure. At Chicago, the Great Western has placed 3400 tons of rails and 3000 tons of track accessories with local mills, while the Illinois Central has ordered 15,000 tons of rails from Chicago plants and 5000 tons from the Alabama producer. The Milwaukee's purchase of 20,000 tons from Chicago makers contrasts with estimated requirements of 50,000 tons filed with the transportation coordinator last fall.

Extension of the time limit for closing rail contracts at the current price of $36.37½ has been officially approved by directors of the Steel Institute. Under the new dispensation contracts will be accepted until April 15 and deliveries can be made until Aug. 31. The Erie is expected to close shortly against its inquiry for 42,000 tons of rails and 12,000 tons of accessories, and the Nickel Plate will soon enter the market.

FABRICATED structural steel awards, at 29,200 tons, are the second largest of the year. Outstanding awards are 5540 tons for a Kansas City auditorium, 5000 tons for a housing project in New York and 3785 tons for a railroad bridge at Cairo, Ill. New structural projects total 21,400 tons. Bids have been taken on a pressure conduit for the St. Louis waterworks calling for 11,000 tons of plates.

Declines at Pittsburgh, Philadelphia and Chicago have reduced THE IRON AGE composite for heavy melting scrap from $13 to $12.67 a gross ton. The pig iron and finished steel composites are unchanged at $16.90 a ton and 2.028c. a lb. respectively.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Mar. 20, 1934	Mar. 13, 1934	Feb. 20, 1934	Mar. 21, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.26	$19.26	$19.26	$13.34
No. 2, Valley furnace	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti	18.13	18.13	18.13	13.82
No. 2, Birmingham†	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.	18.76	18.76	18.76	13.50
Basic, Valley furnace	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	16.89
Malleable, Chicago*	17.50	17.50	17.50	15.50
Malleable, Valley	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago	23.54	23.54	23.54	23.17
Ferromanganese, seab'd carlots	85.00	85.00	85.00	68.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh	36.00	36.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.60
Bars, Chicago	1.80	1.80	1.80	1.70
Bars, Cleveland	1.80	1.80	1.80	1.65
Bars, New York	2.08	2.08	2.08	1.95
Plates, Pittsburgh	1.70	1.70	1.70	1.60
Plates, Chicago	1.75	1.75	1.75	1.70
Plates, New York	1.98	1.98	1.98	1.648
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago	1.75	1.75	1.75	1.70
Structural shapes, New York	1.95¼	1.95¼	1.95¼	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	1.75	1.75	1.75	1.45
Cold-rolled strips, Pittsburgh	2.40	2.40	2.40	1.80

Finished Steel

	Mar. 20, 1934	Mar. 13, 1934	Feb. 20, 1934	Mar. 21, 1933
Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.25	2.00
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.10
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.70
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.40
Hot-rolled sheets, No. 10, Chicago dist. mill	1.85	1.85	1.85	1.50
Wire nails, Pittsburgh	2.35	2.35	2.35	1.85
Wire nails, Chicago dist. mill	2.40	2.40	2.40	1.90
Plain wire, Pittsburgh	2.20	2.20	2.20	2.10
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.15
Barbed wire, galv., P'gh	2.85	2.85	2.85	2.35
Barbed wire, galv., Chicago dist. mill	2.90	2.90	2.90	2.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$14.25*	$14.50	$14.25	$9.00
Heavy melting steel, Phila.	*11.75*	12.00	11.75	6.75
Heavy melting steel, Ch'go	*12.00*	12.50	10.75	5.25
Carwheels, Chicago	*11.75*	12.25	11.75	8.00
Carwheels, Philadelphia	13.00	13.00	12.75	8.00
No. 1 cast, Pittsburgh	13.75	13.75	12.25	9.00
No. 1 cast, Philadelphia	13.25	13.25	12.50	8.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	6.25
No. 1 RR. wrot., Phila.	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go (net)	9.50	9.50	9.25	4.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.50	$1.75
Foundry coke, prompt	4.25	4.25	4.25	2.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.75	7.75	5.00
Lake copper, New York	8.00	8.00	8.00	5.25
Tin (Straits), New York	*54.25*	54.35	52.00	23.90
Zinc, East St. Louis	4.37½	4.37½	4.40	3.15
Zinc, New York	4.72½	4.72½	4.75	3.52
Lead, St. Louis	3.90	3.90	3.90	3.12½
Lead, New York	4.00	4.00	4.00	3.25
Antimony (Asiatic), N. Y.	**7.654**	7.50	7.15	5.95

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
March 20, 1934	2.028c. a Lb.	$16.90 a Gross Ton	$12.67 a Gross Ton
One week ago	2.028c.	16.90	13.00
One month ago	2.028c.	16.90	12.25
One year ago	1.923c.	13.56	7.00

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1934	2.028c., Mar. 20;	2.028c., Jan. 2	$16.90, Mar. 20;	$16.90, Jan. 27	$13.00, Mar. 13;	$11.33, Jan. 2
1933	2.036c., Oct. 3;	1.867c., Apr. 18	16.90, Dec. 5;	13.56, Jan. 3	12.25, Aug. 8;	6.75, Jan. 3
1932	1.977c., Oct. 4;	1.926c., Feb. 2	14.81, Jan. 5;	13.56, Dec. 6	8.50, Jan. 12;	6.42, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Production Rises to 32 Per Cent at Pittsburgh

Effect of Labor Difficulties Limited to Finishing Mills — Wheeling and Valley Steel Rates Unchanged—Scrap Declines

PITTSBURGH, March 20. — The triple threat of labor problems in the automotive, steel and bituminous coal industries has obscured the immediate outlook in the local steel district. Open-hearth activity, however, has not suffered, and producers are still maintaining fairly steady operating schedules against commitments already on their books. Railroad business and a surprising influx of miscellaneous orders for certain heavy products are tending to offset the lag in business from other sources.

In the Pittsburgh area ingot output for the current week will average slightly higher at 32 per cent of capacity. Production in the Wheeling district is holding its own at around 75 per cent. Valley mills are likewise holding at 52 per cent.

The first symptoms of current labor ills are more apparent in finishing mills. Sheet mills have revised schedules downward to about 55 per cent, chiefly as a consequence of reduced takings by the automotive industry and the virtual absence of forward placements. Strip mills are being similarly affected. The tin plate group seems to be displaying excellent staying powers, although a revision in operating schedules by the leading producer this week has effected a five-point decline for the group to around 75 per cent of total capacity. With consuming markets for tubular products and wire goods behind seasonal expectations, pipe and wire production continues to drift along an indefinite course. Structural mills are only fairly busy, with new inquiries and awards for the week failing to improve the outlook.

Scrap trading has virtually halted, pending clarification of labor difficulties, and some grades are sentimentally soft. The Tata Iron & Steel Works, India, has placed orders in this district for part of its usual annual requirements of mill rolls.

Pig Iron

Small-lot demand for miscellaneous spot requirements has improved. No notable activity, however, is apparent among local foundries, though in the case of one or two producers of specialty castings melt has increased. The placing of railroad business, particularly by the Pennsylvania Railroad, should bring continued improvement. Only one merchant stack continues active in this district.

Semi-Finished Steel

Slight abatement in the movement to non-integrated mills of sheet bars has been offset partly by a quickened demand for billets and skelp. The general run of business, however, comprises moderate coverage for early consumption. Forward interest is naturally arrested at the moment by labor unsettlement.

Bolts, Nuts and Rivets

A fair demand from the railroads is being enjoyed. Orders are generally restricted, however, to prompt delivery. The outlook for sustained buying finds its chief support in tne railroad purchasing program.

Rail and Track Accessories

Opening of bids on March 20, covering the New York Central's requirements of rails and companion fastenings, holds the center of the stage in this market. No other new inquiries or orders of importance have reached producers here in the past week. A few quarterly inquiries for general railroad requirements are up for figuring. The local rail mill last week completed its short run on a release against the Pennsylvania Railroad order for rails, and is this week engaged only moderately on sheet bars. Some mills are fairly busy rolling track accessories against orders received earlier in the quarter.

Bars

Interest in merchant bars has contracted in the face of labor problems hanging over consuming industries. Although specifications already placed by the automotive industry are being executed according to schedule, there is a noticeable lack of releases for delivery after the first quarter. No particular change in demand from other consuming groups can be recorded. Alloy bars are moving in rather restricted quantities, chiefly to the automotive trade. Current quotations are being carried into second quarter.

Although a few small orders are sustaining activity in the reinforcing bar market, aggregate tonnage is by no means encouraging. State highway and Federal projects continue to be the chief source to activity. Important awards and inquiries failed to appear in the past week.

Cold Finished Steel Bars

Some hesitancy in placing forward specifications is noticeable on the part of motor car manufacturers. Until labor questions in the automotive industry are settled, cold-finished bar demand from that source will probably manifest no particular trend. Although agricultural implement manufacturers have been taking a fair share of recent tonnage, their requirements this season have not been considered normal. Jobbers still are well covered as a consequence of anticipatory contracting prior to the last two price advances.

Plates and Shapes

New orders for plates in this district are slightly improved, with barge work a factor. Present rolling schedules, however, are being sustained largely by orders from railroads, and particularly by the Pennsylvania Railroad's car building program. Important tank work appears to be nonexistent.

Only one large-sized structural project was included on a rather meager list of new work that appeared during the week. About 5000 tons of shapes will be needed for a power plant at Boulder Dam, on which bids will be accepted until April 5 by the Bureau of Reclamation at Denver. The only large award reported here was to the American Bridge Co. for 2000 tons for an industrial building at Sayre, N. J.

Tubular Goods

Inquiries for line pipe for domestic laying are unimportant. Demand for oil country goods is fairly well sustained. Although interest in the prospective tonnage of pipe to be purchased by the Soviet Government has not waned, the placing of the order still awaits establishment of definite credit channels for financing the project. Bids were received last week on a small tonnage of welded steel pipe, which will be used at the Montgomery Island dam. The volume of boiler tube business is considered to be satisfactory, in relation to January and February business, although bookings for March are running behind December. A slight pickup in calls for mechanical tubing from the automotive industry is noticeable. Tube mills are probably operating at around 30 per cent.

Wire Products

Although an extremely gradual improvement in the movement of wire goods can be detected as the first quar-

ter closes, aggregate volume for the period has failed to meet seasonal expectations. A more auspicious record for the first quarter has undoubtedly been hampered by the fact that inventories generally are ample as a result of heavy contracting prior to the price advance in the fourth quarter. Very little interest in second quarter delivery is evident.

Sheets

Precarious labor conditions in the automotive industry have adversely affected demand for automobile sheets. Specifications against such contracts have diminished quite noticeably in the current week, and forward covering by the motor car makers is generally absent. Sheet orders from the Pennsylvania Railroad, however, have partly offset the decline in demand from the automotive group. Fairly sizable placements of hot-rolled annealed sheets by that carrier for car roofing have reached mills in this district, and this business will provide some benefit, though small, to schedules for a short period. These sheets are required for delivery during the next seven weeks. Miscellaneous demand has not declined perceptibly, but consumers in the general group are not displaying vigorous interest at the moment. Sheet mill operations have fallen off to about 55 per cent of capacity.

Tin Plate

Operations have slid off to around 75 per cent of capacity. A leading independent mill, however, is maintaining its recent rate of 80 per cent. Most producers report fairly sizable commitments for the next two weeks, but beyond the turn of the month the outlook is not clear. An expected seasonal bulge in demand from can manufacturers would tend to offset any precipitate decline from the present rate of activity, but a large share of recent tin plate shipments has undoubtedly swollen consumers' stocks considerably. There is some doubt, therefore, whether the usual acceleration in the early summer months will be experienced this year.

Strip Steel

Specifications are holding up fairly well, but second quarter business has thus far been insignificant. Hesitancy on the part of motor car manufacturers to commit themselves ahead in the face of present labor difficulties is the chief brake on current activity. Agricultural demand is not particularly encouraging. Miscellaneous business, however, is fairly well sustained.

Coal and Coke

Demand for domestic coke has fallen off sharply. Interest in furnace coke, however, still is rather general. Major activity in the bituminous coal market is undoubtedly being retarded by unsettled questions concerning labor. The present wage agreement, which entails a 40-hr. week, will expire on April 1. Demands are being made by labor groups for a 32 or 35-hr. work week, with a 10 per cent wage increase, to succeed the present agreement on April 1. Current discussions are centered on the question of whether four 8-hr. shifts or five 7-hr. shifts will be practical.

Scrap

Labor problems in the automotive and steel industries have caused a virtual impasse in scrap trading. Large mills continue to postpone contracting for tonnage in addition to present commitments, and small users are picking up only occasional carloads to meet running requirements. Although the market has in the past two weeks been bare of indicative transactions, the present tendency is toward softness. Although brokers are not pressing to sell in the face of general business uncertainties, there seems to be no doubt that No. 1 heavy melting steel is procurable in moderate quantities at a top price of $14.50. Scattered car lots of No. 1 steel have recently been picked up at as low as $13.50, but this price has practically no bearing on the general market for this grade. Sympathetic adjustments in quotations on No. 2 railroad wrought, scrap rails and compressed sheet steel have been made. The remainder of the list is marking time. The lifting of current labor difficulties would undoubtedly augur a return to a fairly buoyant scrap market.

Strike Threat Depresses Scrap at Detroit

DETROIT, March 20.—With the automobile industry facing a strike, the scrap market has softened considerably the past week and many grades are off 25c. to 50c. a ton. Although heavy melting steel has declined 50c., hydraulic bundles have not yet been affected and are commanding a premium of 50c. over melting steel. Cast items have not changed. Dealers report increasing requests from steel mills for hold-ups of shipments on current contracts, largely on account of the prospective suspension of motor car production and the consequent effect on steel operations.

Price Filed on Mill Run Cold-Rolled Sheets

A PRICE of 2.65c., Pittsburgh, has been filed with the American Iron and Steel Institute on light cold-rolled sheets, No. 20 gage, mill run. Heretofore, this grade of sheets has been sold with seconds arising up to percentages ranging from 15 to 35 either included or in addition to tonnage on the order. Under the latter arrangement the filed price is 2.75c., Pittsburgh. Prices of seconds when shipped with prime orders are 10 per cent off net item prime price at basing point. On these sheets when sold as all primes an extra of 25c a 100 lb. is charged.

Cold-rolled sheets were sold on a mill run basis for several months prior to the application of the iron and steel code, but the practice was then abandoned.

Prices on Wire Products At Gulf Ports

PRICES on wire nails, fence wire and staples f.o.b. Gulf ports have been filed with the American Iron and Steel Institute, effective March 29. Prices at Houston and Galveston, Tex., are 30c. a 100 lb. above Pittsburgh base; prices at New Orleans are 40c. a 100 lb. above Pittsburgh base. The new quotations follow:

Product:—Drawn Wire

Product Classification	Base Price Per 100 Lb.	F.O.B. Basing Point
Annealed fence wire...	$2.65	Houston and Galveston, Tex.
Annealed fence wire....	2.75	New Orleans
Galvanized fence wire..	3.00	Houston and Galveston, Tex.
Galvanized fence wire.	3.10	New Orleans

Product:—Wire Nails, Staples and Barbed Wire

Wire nails	2.75	New Orleans
Polished fence staples..	3.35	Houston and Galveston, Tex.
Polished fence staples...	3.45	New Orleans
Galvanized fence staples.	3.60	Houston and Galveston, Tex.
Galvanized fence staples	3.70	New Orleans
Galvanized netting "	4.75	Houston and Galveston, Tex.
Galvanized netting "	4.85	New Orleans
Barbed wire.....	3.15	Houston and Galveston, Tex.
Barbed wire.....	3.25	New Orleans

The operating rate of the steel industry for the week beginning March 19 was 46.8 per cent as compared with 46.2 per cent last week, according to the American Iron and Steel Institute.

Steel Rate Dips to 47 Per Cent in Chicago District

Specifications from Automobile Industry Taper—Great Western, Milwaukee and Illinois Central Distribute Rail Tonnages

CHICAGO, March 20.—The threatened automobile workers' strike is the most potent influence in the iron and steel market today. Shipments of finished steel to automobile centers are undiminished, except to the Nash plants, which are still shut down. However, new specifications from this source are tapering. Business, on the whole, is moderately less active, as reflected in ingot output, which has dropped two points to 47 per cent of capacity.

On the brighter side of the market are announcements of rail distributions by the Chicago Great Western, the Illinois Central and the Milwaukee road, the latter having given 15,000 tons to Illinois Steel Co. and 5000 tons to Inland Steel Co. This purchase of 20,000 tons is in contrast with an estimate of 50,000 tons made last fall. The Great Western is contemplating buying 500 freight cars. Rail mill production, though steady at the moment, will probably expand soon under the pressure for deliveries for early spring track work.

Some attractive private work has made its appearance in the structural market, but inquiries of this character are scarce and there is no assurance that private enterprise will assume a more commanding position in the demand for structural materials.

Pig Iron

A Federal furnace will go into blast March 23, thereby bringing the count of active merchant stacks to two. The local pig iron market remains active. Prices for Northern iron are firm at $17.50 a ton, local furnaces, and sales are brisk, assuring second quarter books that will be materially heavier than those for first quarter. In spite of the threatened automobile strike there is no letdown in the rate of shipments.

Reinforcing Bars

This market is dragging and dealers are impatient because of the slowness with which public works jobs are moving. The stumbling block appears to be politics. Washington apparently is trying to stay clear of open political alliances, but local politicians are unwilling to step aside. There is also a controversy raging as to the use of, and quotations on, mesh for Illinois road work. On the whole, both inquiries and lettings are few and far between. The legality of the Beloit, Wis., high school project is in question and bids have been thrown out on a teachers' college at Terre Haute, Ind.

Cast Iron Pipe

Consumer interest in this commodity is extremely dull. Private business is not developing, and public work, though large on paper, is dragging because of red tape. Utilities have placed a few carloads of gas pipe. Milwaukee is now prepared to start its water treating plant, and Evanston, Ill., will require a small tonnage of special fittings for a new water storage tank that is under consideration.

Rails and Track Supplies

The Illinois Central's rail purchase amounted to 20,000 tons, of which 10,000 tons was taken by Illinois Steel Co., 5000 tons by Inland Steel Co. and 5000 tons by the Tennessee company. The Chicago Great Western has ordered 3400 tons, of which 2700 tons went to Illinois and 700 tons to Inland. This railroad has also placed 3000 tons of accessories. The general flow of track supplies is accelerating and there are still sizable tonnages to be bought to accompany rails that recently have been added to mill books. Rail mill operations are steady, but it is probable they will be speeded up to meet demands for spring deliveries.

Cold-Rolled Strip

Output is near capacity, but producers find the outlook clouded by threats of strikes at automobile plants, which take the bulk of this commodity. More business is coming from miscellaneous users, though the aggregate tonnage is not large.

Wire Products

Shipments are gaining and output has reached a range of 45 to 50 per cent of capacity. Wire goods are moving in larger quantities to the South and Southwest, but merchant sales for the country as a whole are dragging. Yet the outlook is not unfavorable and sellers expect April to prove a satisfactory month, especially in fencing and probably also in nails. The manufacturers' tonnage is far above last year, and so far it has not been seriously affected by the threat of strikes in automobile centers. Second quarter contracts are now coming in freely and bookings give excellent promise of exceeding those for the first quarter.

Plates

The Illinois Central is now inquiring for about 3000 tons of material for its car and locomotive repair program. Mills are still waiting for distribution of the Van Sweringen car material and can now look forward to the steel needs for 500 cars that the Chicago Great Western may buy. A large quantity of pipe and plates will be required for a reservoir at St. Louis, and the Natural Gas Service Corpn., Jackson, Miss., is sponsoring a large gas distribution project. A number of water supply tanks, among them one at Temple, Tex., will take a few hundred tons each.

Structural Material

Awards have expanded to 6500 tons and include 2600 tons for a department store at Indianapolis. Inquiries are also much improved, the total reaching 11,000 tons, not including 10,000 tons that may be used for a reservoir at St. Louis. About 5000 tons will be required for a power plant at Boulder Dam, and ore docks in Michigan will take an additional 2000 tons.

Bars

Shipments of bars to automobile plants are steady, but new specifications are lighter. Whether this recession reflects caution resulting from strike threats, or whether output has reached its peak as measured by consumer demand for cars, is not quite clear to Chicago producers. One thing is evident and that is automobile manufacturers have recently spread accessory orders to a far greater number of independent plants, probably as a defensive move in the event of strikes. The farm implement industry, having reached 50 per cent of capacity, is a consisent user of steel mill products.

Scrap

Insofar as the price structure is concerned, the bloom is off the scrap market. The high reached a week ago brought out more or less of a flood of scrap from far and near and then, to cap that situation, mills started to take off open-hearths. Scrap dealers are trying to keep one eye on the local market and the other eye on developments in automobile centers where strikes, if they occur, will reach back to steel mills in their effects. The Santa Fe has at last started to sell its large accumulation and the Burlington is offering several thousand tons.

Trading in Non-Ferrous Metals Limited To Carlots Covering Immediate Needs

April Lead in Fair Demand at 4c. a lb.—Spelter Sales Total 2000 Tons—Tin Returns to 54.25c. on £2 London Advance

NEW YORK, March 20.—As United States producers control most of the world copper stocks, Continental buyers are closely watching code and market developments here. Domestic demands for electrolytic are still very light, but the price remains steady at 8c. a lb., Connecticut valley, for prompt and futures. Sales abroad continue to be in good volume, and the trading early today was at a price well above 8c. despite the bearish attitude that operators displayed late last week. Major interests here are now selling custom metal on foreign markets to the extent of about 10,000 tons monthly. There is an upward trend in consumption abroad, but the price position is definitely influenced by the selling attitude of American interests, and any pronounced price strength in the near future will probably depend on how the market here reacts to code and labor developments. The code submitted on March 12 by the United States Copper Association was judged by the Administration as being wholly inadequate, and Deputy Administrator King requested that a more inclusive document be presented at the second hearing which opened today. After many meetings, the copper industry decided to regulate only working hours and wages, but even these provisions were severely criticized at the outset. The suggested amendments made by the Government today included higher wages, shorter working hours, and plans prescribing the filing of selling prices, the elimination of destructive and excessive prices, establishment of sales quotas, and the control of unfair competitive practices. The industry is strongly opposed to many of these provisions, and it is likely that a satisfactory arrangement will be difficult to attain.

The Week's Prices. Cents Per Pound for Early Delivery

	March 14	March 15	March 16	March 17	March 19	March 20
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	54.00	53.95	53.90	....	53.62½	54.25
Zinc, East St. Louis	4.37½	4.37½	4.37½	4.37½	4.37½	4.37½
Zinc, New York	4.72½	4.72½	4.72½	4.72½	4.72½	4.72½
Lead, St. Louis	3.90	3.90	3.90	3.90	3.90	3.90
Lead, New York	4.00	4.00	4.00	4.00	4.00	4.00

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb. delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 16c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.65c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	55.50c. to 56.50c.
Tin, bar	57.50c. to 58.50c.
Copper, Lake	9.75c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, castings	9.25c. to 10.25c.
*Copper sheets, hot-rolled	15.00c.
*High brass sheets	13.75c.
*Seamless brass tubes	16.25c.
*Seamless copper tubes	16.25c.
*Brass rods	12.25c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	5.75c. to 6.75c.
Lead, sheets	7.75c.
Antimony, Asiatic	9.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	33.00c. to 34.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	58.00c.
Tin, bar	60.00c.
Copper, Lake	9.00c.
Copper, electrolytic	9.00c.
Copper, castings	8.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy and wire	6.25c.	7.00c.
Copper, light and bottoms	5.25c.	6.25c.
Brass, heavy	3.50c.	4.25c.
Brass, light	3.00c.	3.625c.
Hvy. machine composition	4.75c.	5.625c.
No. 1 yel. brass turnings	4.25c.	5.125c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	3.00c.	3.625c.
Zinc	2.50c.	3.125c.
Cast aluminum	9.50c.	11.25c.
Sheet aluminum	12.25c.	13.50c.

Tin

This market is practically inactive as principal consumers are engaged with potential labor difficulties. The London market, however, is distinctly more optimistic on the strength of a recent decision of the International Tin Committee to postpone for several months any revision of production quotas. The New York price for Straits and English refined weakened late last week, but nominally advanced today to the comparatively high position of 54.25c. a lb., following a sharp rise in London. Spot and future standard were priced in London on first call this morning at £234 7s. 6d. and £232 15s. respectively, and Straits in the Far East was available at £233 15s.

Zinc

Liberal tonnages of prompt spelter are currently available at 4.37½c. a lb., East St. Louis, but all important sellers are firmly demanding 2½ points premium for April and May deliveries. The generally severe weather has deferred building activity; therefore the market demand from galvanizers is quite light, and other consuming outlets are cautiously limiting purchases to prompt requirements because of general apprehension regarding the labor outlook. Sellers booked about 2000 tons of Prime Western last week, against 2770 tons in the preceding period, and 3200 tons sold two weeks ago. The recent softness in the spelter price was traceable to extreme selling pressure in several directions, and was somewhat unexpected in view of the strong Tri-State ore situation. Joplin producers are selling freely at a firm $30 a ton price for prime and flotation concentrate, and the heavy volume of shipments last week reflected in a stock decline of almost 2000 tons. Output for the week was 3500 tons, sales equaled 4800 tons, and shipments during the week aggregated about 5360 tons.

Lead

A steady tone prevails throughout the market on the strength of moderate daily demands from all consuming lines. The price basis is unchanged and firm at 4c. a lb., New York, and 3.90c., St. Louis, and ample quantities of metal are available for delivery positions through April. Considerable April metal is yet to be purchased, as only 11,000 tons has been booked, and, in addition, sellers anticipate additional March commitments to aggregeate about 3000 tons. The trade expects a stock increase when February statistics are announced, but the increase will probably be far under the advances of previous months. In any case, current curtailment of production should reflect in marked stock reductions during April, and as soon as the statistical trend is definitely favorable an advance in the refined metal price is practically assured.

REMOVE A FEW BOLTS . . . OPEN IT UP

FOR INSPECTION

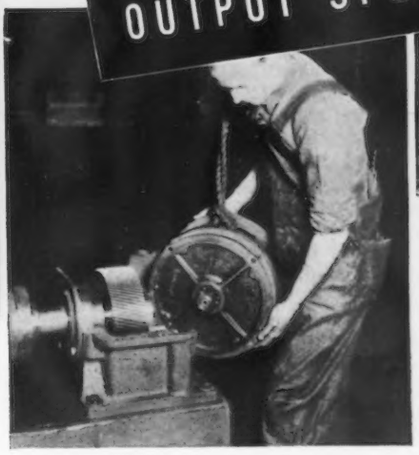
Remove a few bolts . . . tilt the cover . . . and all parts of the Westinghouse Double-reduction Gearmotor are accessible for inspection. Split-frame construction makes it unnecessary to disturb motor, gears or driven equipment. No need even to drain the oil.

(Above) *The high-speed gear is easily removed from the intermediate shaft in an ordinary press. It is then a simple matter to press on the new gear.*

(Left) *By removing the two lower bolts between the motor and gear case, the high-speed pinion is made accessible for easy removal with a gear puller. Oil should be drained before removing the motor.*

CHANGE OF OUTPUT SPEED

(Above) *Take out 3 more bolts and the inner bearings of the intermediate and low-speed shafts are released. The intermediate shaft is then easily removed, for close inspection or changing gear ratio.*



FOR either inspection or changing of gear ratios on the Westinghouse double-reduction Gearmotor . . . there is no need to disturb mounting bolts, or even the coupling between gearmotor and the driven machinery. Therefore, alignment is not affected. In practically all cases, the desired output speed can be easily obtained by replacing the high-speed pinion and gear as shown above.

Westinghouse single-reduction units, too, are readily accessible—the bracket on the gearing end is as easily removed as the standard motor bracket.

This is only one of the many advantages of Westinghouse gearmotors. For complete information, address Westinghouse Electric & Manufacturing Company, Room 2-N, East Pittsburgh, Pa. T 79976

Only **Westinghouse** Double-Reduction Gearmotors have Split-frame Construction which facilitates inspection and change of speed

Westinghouse

Production Holds at 69 Per Cent In Cleveland District

Continuance of Present Rate Depends on Avoidance of Automobile Strike—Some Protective Covering on Bars, Plates and Shapes

CLEVELAND, March 20.—Maintenance of present steel plant operations depends on the avoidance of the threatened strike in the automotive industry. Immediate suspension of large shipments of steel that are daily going to that industry is looked for in case automotive production is halted by a strike, and this would necessarily cause a sharp cut in the operations of steel plants that supply that industry.

In spite of present uncertainties the automotive industry has gone ahead with the placing of steel tonnages for April shipment and has continued to issue releases. While the volume of new business has declined, this was to be expected after the recent heavy buying. In only a few cases have shipments been held up and these involve only small tonnages.

The ingot output in the Cleveland-Lorain territory is unchanged this week at 69 per cent of capacity and finishing mill operations in northern Ohio are being maintained.

Mills continue to book contracts for the second quarter, largely for bars, plates and shapes. Some consumers see the possibility of higher prices before the end of the quarter in case labor costs are increased, and this is stimulating the placing of contracts. However, forward buying of sheets and strip steel is confined largely to April requirements.

Pig Iron

Sales for the second quarter have been well maintained. A leading producer sold 8000 tons, duplicating the tonnage booked during the previous week. However, buying has been checked during the past day or two by the possibility of a strike in Michigan automobile plants. Several prospective purchasers in that field advised producers that they would withhold signing of contracts for a few days pending the outcome of the strike threat. However, there has been no curtailment in shipping orders.

Sheets

Some additional business for April shipment has come from the automotive industry, although new tonnage from that source has subsided in the last day or two. Automobile plants generally are taking shipments according to schedule, only a very limited tonnage having been held up, which may be due to threatened labor troubles. Demand from other sources is fair. The refrigerator industry continues to take good tonnages, and some new business has come from agricultural implement manufacturers.

Strip Steel

Demand from automobile plants shows no slackening. Some good tonnage in new business and in releases against contracts came during the week from some of the leading automotive interests. Demand from other sources is not active. Makers of beer barrels and cases look for some seasonal revival in their business shortly.

Iron Ore

The Ford Motor Co., which for some time was the largest market buyer but which has bought virtually no ore during the past two years, has advised ore firms that it will again require a tonnage of ore this year. No intimation has been given as to the amount that will be needed. Several times the Ford company made the first purchase of the season and the market price for the year was established by the Ford tonnage. The Ford inquiry is expected to be out in about two weeks.

Consumption of Lake Superior ore during Feb. was 1,727,746 tons, an increase of 71,443 tons over Feb. This compares with 634,443 tons consumed in Feb. last year. Furnace stocks March 1 amounted to 26,040,550 tons, and stocks in furnace yards and on docks were 31,216,436 tons as against 30,152,106 tons on the same date last year. On March 1 there were 76 furnaces in blast using Lake ore, a gain of three for the month. Furnaces in the Central district consumed 927,917 tons of ore in Feb., a gain of 49,753 tons and Lake front furnaces used 792,014 tons, a gain of 24,989 tons. All-rail furnaces used 2284 tons, a loss of 3239 tons and Eastern furnaces melted 5531 tons, a loss of 60 tons.

Rails

An extension of 15 days to April 15 has been made in the time limit for closing rail contracts at the $36.37½ price and an extension of two months to Aug. 31 has been made for rail deliveries. The Erie rail tonnage is expected to be placed shortly and a rail inquiry is looked for from the Nickel Plate. The Erie is taking bids for 50 cement cars. Both the Erie and Chesapeake & Ohio will, to a considerable extent, use reconditioned axles for their new cars.

Bars, Plates and Shapes

Current orders for steel bars from miscellaneous users are fair. Some consumers are taking out all their contract tonnage for the quarter and a smaller percentage will allow tonnage to lapse. Shapes and plates are rather quiet. Mills have lost 2200 tons of sheet steel piling for the Huron breakwater, for which stone will be used. For Brook Park culverts, Cleveland, 230 tons of reinforcing bars will be required in addition to the tonnage recently placed. Formal placing of 2500 tons of reinforcing bars for a Cleveland sewage disposal plant is still held up awaiting release of PWA funds.

Coke

Prices on by-product foundry coke have been revised as a result of a ruling of the Interstate Commerce Commission putting this coke on a mileage railroad freight rate basis which became effective March 15. Uniform prices are provided for each delivery point. Prices in northern Ohio are based on $6.60 and $7.25 Ashland, Ky., prices, plus the freight rate for shipment respectively to the eastern and western parts of the State. New delivered prices are $9.25, Cleveland, a 2c. decline; $9.25 Akron, a 23c. advance and $9.15 Canton, a 12c. decline.

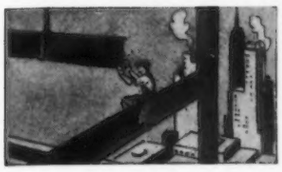
Scrap

Activity has reached almost a standstill. Youngstown mills have suspended shipment and a local consumer is taking only blast furnace scrap. Scrap has been shipped into the mills faster than needed, and another reason for the suspension is the possibility of curtailed mill operations which would result should a strike be called in the automotive industry. The market has a slightly weaker tone, although prices are untested.

Foundry Equipment Orders Increase

NET orders for foundry equipment reached an index figure of 65.8 in February, as compared with 37.2 in January and with 16.12 in February last year, as shown by reports from 19 members of the Foundry Equipment Manufacturers' Association.

Steel Demand Remains Slow at Philadelphia



Production Advances Slightly on Backlog Orders — Reinforcing Bar Releases Heavier—Scrap Prices Weaker

PHILADELPHIA, March 20. — Although demand for finished steel products in this district has apparently tapered off in the last week, steel ingot production has risen slightly to 34 per cent of capacity. The leading interest has maintained its recent comparatively high rate and a large independent has added an open-hearth furnace. The ability of mills to maintain and even increase their operating rates is explained by railroad and shipbuilding tonnage on company books together with the identified structure arrangements under the code. Pennsylvania Railroad orders both for freight car construction and track work were distributed over a long period and the tonnage works nicely into mill schedules when a temporary lull in miscellaneous demand occurs. The Pennsylvania has not yet released all the steel in its recent orders and further action is expected in the near future. Of particular recent interest is an order for 500 cast steel underframes for flat cars which went to the General Steel Casting Corpn. for production at Granite City, Ill. The use of cast steel for underframes is something of an innovation with this carrier. Underframes for an additional 1000 flat cars are yet to be placed.

Structural steel demand continues light, although prospective tonnage is in fair volume. Reinforcing bars are somewhat more active as road work in Pennsylvania and New Jersey gets under way. Plate orders for the Van Sweringen road freight cars are beginning to be distributed and apparently a large number of producers will eventually share in the business. The locomotive builder in the district has the best backlog in two or three years and inquiries for 35 additional units have come out. The South African State Railways are also inquiring in this country for 50 locomotives.

Pig Iron

Small orders have been a little more numerous in the last week, but heavy tonnage buying is still deferred. The low rate of ingot production among non-integrated mills is enabling them to extend their stocks over a longer period than seemed possible earlier in the year. Talk of higher price is still being heard, but wage policies are deferred by other developments at Washington.

Bars, Plates and Shapes

The United States Government is taking bids tomorrow on 3000 tons of structural steel for improvements to the flying field at Middletown, Pa. Bids on 1100 tons of sheet steel piling for a breakwater at Cape May, N. J., will probably be thrown out because they exceeded the estimate. Further action on the high speed transit line over the Philadelphia-Camden bridge is not scheduled until next month. New structural inquiriy is light and fabricating shops are drawing almost entirely upon their backlogs. Reinforcing bars are more active as weather conditions improve, but merchant bars continue very dull. The Navy Department is taking bids today on 4700 tons of plates for coast guard cutters, but large inquiry is otherwise lacking. As yet, car builders in this district have released very little of the tonnage required for the freight car construction program of the Van Sweringen railroads. The Seaboard Air Line may buy 1100 freight cars if PWA funds are forthcoming. Other steel requirements of the eastern carriers are chiefly for repair purposes.

Warehouse Business

Sales of finished steel products out of warehouse are scarcely holding to corresponding February levels. However, the approach of spring is expected to activate outside projects requiring small tonnages. Prices are unchanged.

Imports

The following iron and steel imports were received here last week: 859 tons of pig iron from the Netherlands, and 96 tons of steel tubes, 95 tons of sponge iron, 18 tons of steel bars, 18 tons of steel forgings and 7 tons of cold-drawn steel wire from Sweden.

Sheets

The market on flat-rolled steel products continues very dull. Labor uncertainty is keeping the largest automotive customer in the district out of the market and the other principal outlets are dormant. Miscellaneous demand is also disappointing. A price of 2.65c., Pittsburgh, on No. 20 gage light cold-rolled sheets, mill run, has been filed with the American Iron and Steel Institute. Heretofore such material has been priced at 2.75c. with a maximum percentage of seconds specified, depending on the gage of the sheets.

Scrap

Lack of mill interest in forward purchases has finally been reflected in weaker quotations on scrap. No. 1 heavy melting steel is now available in small quantities at as low as $11.50 and dealers would have no difficulty making a profit at this level. However, export interest has been revived as the result of more quiet domestic conditions. The cast grades continue strong, although pipe and shafting are quotable at a lower range.

Large Scrap Purchase In Buffalo District

BUFFALO, March 20.—The leading consumer of the district made its largest scrap purchase in some time, buying 15,000 tons of No. 1 and No. 2 heavy melting steel. No authoritative figure on the price paid has been divulged, but it is believed to have been at around $13.50 for the No. 1 and $12 for the No. 2. Another mill purchased about 2000 tons, paying $13 for the No. 1 and $12 for the No. 2. The mill making the larger purchase is known to have low supplies of scrap and, with the rolling schedules now current, is expected to come into the market again within the course of the next two weeks for more tonnage. It is understood also that several hundred tons of No. 1 was purchased during the week at $13.25. Sales of No. 1 machinery cast at $13.25 and $13.50 have occurred.

Operations of Buffalo steel mills are going along as before. Bethlehem's Lackawanna plant continues to operate 13 open-hearths, Republic Steel Corpn., five, and Wickwire-Spencer, one. The Seneca sheet division of Bethlehem is running at 90 per cent of capacity.

A local reinforcing bar maker has the contract for 600 tons for additions to the plant of the Eastern States Milling Co. and there have been a few small lettings of structural steel.

Pig iron orders are coming in for second quarter delivery in increased volume. Few sizable inquiries are out, but several lots of larger than carload lots have been negotiated. Makers are of the opinion that a price advance is inevitable, inasmuch as increases have occurred in the prices of all raw materials, as well as labor.

Southern Business On Even Keel

BIRMINGHAM, March 20.—Interest in pig iron is not especially active. A fair volume of new tonnage is being booked weekly, but the orders are largely of small size.

There has been no change in blast furnace operations in nearly two months, ten being active.

Cast pipe bookings last week were restricted. The St. Louis tonnage, amounting to about 300 tons, placed with two Birmingham plants and reported recently, was released last week and shipped. This week Lincoln, Neb., will open bids on 300 tons and Fort Peck, Mont., on 1500 tons, while a project at Greenville, S. C., will take about 350 tons. Quick shipment business, such as came from the CWA and other sources, has dwindled. Most of the PWA tonnage recently placed will not be required for 30 or 60 days. Pipe prices continue on a base of $36 to $37, Birmingham.

Steel

Additional railroad tonnage has been booked, but no announcement has been made as to the sources of this new business. The Ensley rail mill is now provided with a satisfactory backlog. In addition to the tonnage already reported, amounting to more than 40,000 tons, there are a number of other smaller orders and also releases against the Louisville & Nashville order, placed last November, which originally amounted to 18,000 tons of rails and 2000 tons of track material.

There is a fair demand for various light products.

Ingalls Iron Works is low bidder on four barges for the TVA, to be used at Wheeler Dam, requiring about 450 tons of steel.

The open-hearth schedule last week was the same as for the three preceding weeks, with 13 units operated. No change is expected this week.

Construction Active In Western States

SAN FRANCISCO, March 20.—The Northwest continues in the construction spotlight with bids asked on tunnels, vertical shafts and structures at the huge Fort Peck dam near Glasgow, Mont. Approximately 2946 tons of shapes, 3227 tons of bars, 4943 tons of plates and 300 tons of strip are specified in this project.

At Portland, Ore., a tentative date has been set for bids for the Bonneville cofferdam, which requires 1000 tons piling.

New projects, aggregating 5207 tons of shapes, 6641 tons of bars and 5235 tons of plates, include 500 tons of shapes for a pier extension at San Francisco and 2900 tons of bars for the Bureau of Reclamation at Denver.

Awards of 3500 tons of plates for a pipe line and 1500 tons of plates for two dredges at Fort Peck have been made to the McClintic-Marshall Corpn. and the Marietta Mfg. Co., respectively. Consolidated Steel Corpn. took 950 tons of shapes for a racing plant at Arcadia, Cal., and 160 tons of plates at Escondido, Cal. At Vancouver, Wash., the Pacific Coast Steel Corpn. was awarded 985 tons of bars for a grain elevator. Soule Steel Co. took 270 tons of bars for a wharf in Alameda, Cal., and highway work in Tulare County, Cal.

The week's lettings totaled 1223 tons of shapes, 1646 tons of bars and 2510 tons of plates.

Pipe Lines

International Pipe Line Co., Helena, Mont., recently chartered as an interest of Texas Corpn., 135 East Forty-second Street, New York, plans early construction of welded steel pipe line from oilfield district at Cutbank, Mont., to Sunburst, Mont., for crude oil supply for refinery.

Burrton, Kan., plans steel pipe line system for gas distribution. Bond issue of $20,000 has been approved at special election. Hefling & Hughes, 20 Second Avenue West, Hutchinson, Kan., are consulting engineers.

West Coast Pipe & Steel Co., Los Angeles, has submitted low bid to Redlands, Cal., for 8820 ft. 20-in., 10-gage welded steel pipe at unit price of $1.14 per ft. Consolidated Steel Corpn., Los Angeles, submitted low bids to same city for 14,280 ft. 20-in., 12-gage, and 5580 ft. 22-in., 12-gage, at unit prices of $0.88 and $0.99, respectively.

Smith Brothers Refining Co., McLean, Tex., is considering steel pipe line for natural gas service at new carbon black plant in western part of Wheeler County, Tex., to handle daily capacity of 80,000,000 cu. ft. Application has been made for permission to build plant.

Natural Gas Service Corpn., Jackson, Miss., will apply for Federal loan to construct 8209 miles of pipe for a gas line.

Cast Iron Pipe

Northampton, Mass., will close bids April 2 on 5000 ft. of 6-in. and 3000 ft. of 12-in., class C.

Gloucester, Mass., has awarded 250 tons of 6 to 12-in. cement lined pipe to Warren Founry & Pipe Corpn.

Bellingham, Mass., closes bids March 22 on 200 ft. of 6-in. and 5000 ft. of 8-in.

Hammond, Ind., asks bids until March 29 for 24-in. line under Grand Calumet River, Calumet Avenue, for water supply.

Dugger, Ind., plans pipe line for water supply. Fund of $76,000 is being arranged for this and waterworks station. Municipal Engineering Co., Plainfield, Ind., engineer.

Sevierville, Tenn., plans water pipe line system. Fund of $96,000 has been secured through Federal aid for this and waterworks station. Hart, Freeland & Robert, Independent Life Building, Nashville, Tenn., are engineers.

Tucson, Ariz., plans extensions and replacements in water pipe lines. Special election is called for April 3 to approve bonds for $254,000 for this and other waterworks improvements.

Guthrie, Okla., plans extensions and replacements in water pipe line. Fund of $150,000 is being arranged, including improvements in general waterworks. William Ritzhaupt, city engineer.

Del Rio, Tex., will take bids soon for pipe lines in San Felipe district for water service. Fund of $77,000 has been secured through Federal aid, including expansion in waterworks plant. Paul Blevins, Del Rio, is engineer.

Gretna, La., asks bids until March 27 for 26,300 ft. of 4, 6 and 12-in. and about 12½ tons of specials for water supply. Swanson-McGraw, Inc., Balter Building, New Orleans, is engineer.

Milwaukee closes bids March 23 on 750 tons of 12-in., 20 tons 20-in. and 30 tons of special castings.

Oshkosh, Wis., has let 3000 ft. of 6-in. pipe to Glamorgan Pipe & Foundry Co.

Morganville, Kan., asks bids until March 30 for 12,000 ft. 2 to 6-in. pipe for water system; also for 50,000-gal. steel tank on 100-ft. steel tower, motor-driven pumping equipment, etc. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Pender, Neb., will ask bids soon for quantity of 6-in. for water supply, and 50,000-gal. steel tank on 75-ft. tower. Kenneth Young, Baum Building, Omaha, Neb., is engineer.

Eureka, Mont., plans about 16,340 ft. of 6 and 8-in. for water supply line replacements. Fund of $30,000 is being arranged through Federal aid. Frederick Jaqueth, Libby, Mont., is engineer.

Railroad Equipment

Pittsburgh & West Virginia has ordered three 2-6-6-4 locomotives from Baldwin Locomotive Works.

Erie is inquiring for 50 bulk cement cars of 50 tons' capacity.

Donner-Hanna Coke Corpn. has contracted with Pressed Steel Car Co., for rebuilding 100 hopper cars.

New York, New Haven & Hartford has ordered 50 passenger cars from Pullman-Bradley Car Corpn. and 69 air-conditioning units from Safety Car Heating & Lighting Co.

Boston & Maine has borrowed $2,230,000 from PWA for rails and fastenings. An additional loan of $2,628,000 is under consideration; about one-half will be used for roadway and track repairs, and remainder for purchase of four Diesel-electric locomotives, 10 steam locomotives, and 31 passenger coaches.

Baltimore & Ohio will use a recent loan of $4,000,000 for construction of 820 gondola cars, repairing of 4800 freight cars and 200 automobile box cars, and reconditioning 240 locomotives.

The Pennsylvania Railroad has placed $1,100,000 worth of steel and malleable iron castings with a number of makers. Included were 500 cast steel underframes for flat cars which went to the General Steel Casting Corpn. for production at Granite City, Ill.

Midland Continental has ordered one Diesel-electric locomotive from Westinghouse Electric & Mfg. Co.

Chicago Great Western may enter market for 500 freight cars.

Erie took bids March 21 on 50 50-ton covered cement cars.

RAILS

Chicago, Milwaukee, St. Paul & Pacific has ordered 15,000 tons of rails from Illinois Steel Co. and 5000 tons from Inland Steel Co.

Great Northern proposes to purchase 20,000 tons of 110-lb. manganese steel rails together with track fastenings and other material and has sought approval from Interstate Commerce Commission of an application to borrow $5,125,000 which has been allotted by PWA. Included in items it is proposed to buy are 752,050 tie plates and 1272 net tons of 110-lb. angle bars.

Maine Central has applied to PWA for a loan of $313,000 for purchase of 4200 tons of 112-lb. rails and fastenings.

Illinois Central has bought 20,000 tons of rails, of which 10,000 tons was placed with Illinois Steel Co., 5000 tons with Inland Steel Co. and 5000 tons with Tennessee Coal, Iron & Railroad Co.

Chicago Great Western has placed 3400 tons of rails and 3000 tons of track accessories. Of the rails, 2700 tons went to Illinois Steel Co. and 700 tons to Inland Steel Co.

Equipment Builders Oppose Code Price Policy

New York Feels Dissatisfaction of Car Manufacturers With Code Restrictions—Disaffection Noted Among Pipe Jobbers

NEW YORK, March 20.—Car builders in the East with orders from the Van Sweringen lines have not yet formally placed their steel requirements, but tentative allocations indicate that a smaller proportion of the tonnage than usual will go to the larger producers. Thus the railroad equipment builders may be following the precedent of the motor car manufacturers in expressing their dissatisfaction with the steel code by withholding business from the larger mills, which because of their proportionately larger voting power are charged with responsibility for the single-price policy now adhered to in the steel industry. Another, and perhaps more important, reason for the wide distribution of the car steel is the apparent desire to provide the purchasing railroads with a maximum amount of traffic. Although the railroads are said to have no control over the award of the tonnage, considerable cross-hauling will occur if tentative orders for the steel are confirmed.

But regardless of the real reason for the distribution, there is growing doubt in the steel industry itself as to the wisdom of the single-price policy. On the basis of economy in handling and rolling orders, tonnage business certainly merits lower prices than small, scattered orders, it is argued. And the desirability of having sizable backlogs also makes tonnage orders attractive. It is suggested by some that quantity discounts might be adopted which, while giving the large buyer the advantage of lower quotations, would nevertheless preserve the industry's open price policy.

Competition with other industries is developing into a more serious factor so far as car steel is concerned. The Pennsylvania Railroad has placed an order for 500 cast steel underframes for the freight cars which it will build at Altoona, and is reported to be considering the award of additional cast underframes.

Difficulties growing out of the code have extended to the jobbing field. Only about 90 per cent of the pipe jobbers in this district have signed agreements under the code and the remaining 10 per cent are undercutting the market. In some cases they are doubtless drawing on stocks and in other instances they may be purchasing pipe from a small mill which has not joined the code.

Aside from a rise in tin plate specifications and larger releases of reinforcing bars, steel bookings in this district have slumped. Structural steel lettings are few in number, but the total for the week was boosted by a large single award—5000 tons for the Hillside Housing Development, the Bronx, which was placed with the American Bridge Co. All shipments on the Triborough bridge, New York, have been stopped pending a revision of plans to reduce the size of the structure. About 25 per cent of the fabrication work on the towers, which were awarded to the American Locomotive Co., has been completed.

Pig Iron

Furnace representatives report an improved interest in fresh supplies, although most current sales continue to designate prompt and nearby deliveries. Casting schedules of integrated foundries are perceptibly better due to seasonal demands, but jobbing concerns are not sharing in the improved activity to any extent. Sellers are somewhat encouraged by the heavier inquiry in the market, and aggregate bookings during the past seven-day period were comparatively satisfactory at 2500 tons, against 2500 tons in the preceding period, and 1300 tons two weeks ago. Foundries in this district have received orders from the Pennsylvania Railroad for sizable tonnages of car castings, and further railroad awards are expected in the near future.

Ferroalloys

Producers have reaffirmed quotations for second quarter delivery. Ferromanganese is currently available in carloads at $85 a gross ton, seaboard, Spiegeleisen is now priced at $26 a ton, f.o.b. furnace.

Reinforcing Steel

Bookings during the week were very light, but early awards covering additional highway requirements in nearby States are anticipated. Kalman Steel Corpn. will furnish 200 tons for highway reinforcing and structures in Nassau and Chemung Counties, New York, and New Jersey contractors recently placed about 150 tons with several sellers. No announcement has yet been made concerning the 2500 tons of mesh and bars required by the Post Office annex and Midtown Tunnel in New York.

Scrap

This export district has not yet reacted to the general weakness which has appeared in Pennsylvania and the mid-western selling markets. Brokers' buying prices remain unchanged, but they lack the strength which was characteristic several weeks earlier. Eastern Pennsylvania mills are not entering new commitments freely, and the general price tone on all important grades is uncertain. Domestic trading in specialties continues in good volume but is somewhat erratic, and shipments abroad are currently quite heavy with nickel content steels in particular demand from Germany. Exporters continue to purchase steadily for shipment on old foreign accounts, and consumers in England are contracting for additional tonnages. In addition, Poland and Italy are again in the market, but there is little Japanese interest in new contracts.

Boston Scrap Prices Are Unsettled

BOSTON, March 20.—Scrap prices are very much unsettled and it is rather difficult to quote reliable rates due to constant changes. To illustrate, the best price reported paid yesterday for steel turnings was $4.60 a ton on cars shipping point. Today the market appears to be $4 to $4.50 a ton, with few offers at the top price. It is safe to say turnings are easily $1 a ton lower than a week ago, bundled skeleton 50c., and No. 1 heavy melting steel, T-rails, No. 2 steel and breakable cast, 25c. lower. There is not enough activity in other grades of scrap to establish a market. The du Ponts have held up shipping instructions on chemical borings, but prices are holding. The uncertainty of the labor outlook has greatly curtailed the movement of scrap.

Pig iron sales are confined to carlots. The General Fire Extinguisher Co., inquiring for 800 tons, and a Springfield, Mass., melter inquiring for 100 to 300 tons, apparently are in no hurry to close. New Hampshire melters report a pickup in business. One jobbing foundry, flat for six months, has done quite well since Jan. 1.

Due to numerous cash allotments by the PWA, the cast iron pipe outlook is somewhat brighter.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel Base per Lb.
F.o.b. Pittsburgh mill	1.75c
F.o.b. Chicago or Gary	1.80c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.80c.
Del'd Detroit	1.90c.
F.o.b. Buffalo	1.85c.
F.o.b. Birmingham	1.90c.
F.o.b. cars dock Pacific ports	2.30c.
F.o.b. cars dock Gulf ports	2.15c.

Rail Steel
(For merchant trade)

F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c.

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Cleveland	1.95c.
Del'd Detroit	2.06c.
F.o.b. Youngstown	1.95c.
F.o.b. cars dock Pacific ports	2.35c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. Chicago	1.95c.

Rail Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.80c.

Iron

Common iron, f.o.b. Terre Haute, Ind.	1.60c. to 1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.89c.
Common iron del'd New York	1.93c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Birmingham	1.85c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.885c.
F.o.b. Coatesville	1.80c.
F.o.b. Sparrows Point	1.86c.
Del'd New York	1.93c.
F.o.b. dock cars Pacific ports	2.25c.
F.o.b. cars dock, Gulf ports	2.10c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.965c.
Del'd New York	1.9525c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. dock cars Pacific ports (standard)	2.25c.
F.o.b. dock cars Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base, 2.45c. a lb. except at Bethlehem where the price is 2.55c. Delivered price at Detroit is 2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.15c.
Bars, Cleveland	2.15c.
Bars, Buffalo	2.20c.
Bars, Detroit	2.30c.
Bars, eastern Michigan	2.35c.
Shafting, ground, f.o.b. mill, 1¼ in.	3.40c.
1-3/16 to 1½ in.	2.90c.
1-9/16 to 1⅞ in.	2.75c.
1-15/16 to 2⅞ in.	2.60c.
2-15/16 to 6 in.	2.45c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Detroit	1.95c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific ports	2.42½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Detroit	2.45c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific ports	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Detroit	2.50c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.00c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Detroit	2.95c.
No. 20 gage, del'd Phila.	3.04c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.45c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific ports	3.55c.
No. 24 Wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.25c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Gary	2.75c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(f.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c.
All widths up to 24 in., Chicago	1.85c.
All widths up to 24 in., del'd Detroit	1.95c.
Cooperage stock, Pittsburgh	1.85c.
Cooperage stock, Chicago	1.95c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	$2.35
Smooth coated nails	2.35
Galvanized nails:	
15 gage and coarser	4.35
16 gage and finer	4.85
	Base per 100 Lb.
Smooth annealed wire	$2.35
Smooth galvanized wire	2.70
Polished staples	3.05
Galvanized staples	3.30
Barbed wire, galvanized	2.85
Woven wire fence, base column	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	57	38½	¼ & ⅜	+1½	+21½
½	62	50½	½	31½	15
¾	65½	55½	¾	36½	20½
1 to 3	67½	58½	1&1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63½	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	65½	59½	4 to 8	40	28½
7 and 8	67½	57½	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	54½	41½	¼ & ⅜	+2½	+34½
½	60	51	½	32½	17½
¾	64½	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4	45½	33
3½ to 6	69	61	4½ to 6	45	32½
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	33	1½ in.—1⅝ in.	44
2½ in.—2⅝ in.	40	2 in.—2¼ in.	13
3 in.	44	2½ in.—2⅝ in.	16
3¼ in.—3½ in.	47	3 in.	17
4 in.	49	3¼ in. to 3½ in.	18
4½ in. to 6 in.	42	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1½ to 1¾-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	68	3 in.	38
1¼ to 1½ in.	68	3¼ to 3½ in.	41
1¾ in.	68	4 in.	43
2 to 2¼ in.	27	4½, 5 and 6 in.	36
2½ to 2¾ in.	34		

Hot-Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	47
2½ and 2¾ in.	40	4 in.	49
3 in.	44	4½, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1¾-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1¾-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 1 points.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 3.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$32.00
Light rails (from rail steel) per gross ton	31.00
	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ⅜ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	70, 25 and 10
Stove bolts in packages, Ch'go	70, 25 and 10
Stove bolts in packages, Cleveland	70, 25 and 10
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	85
Tire bolts	60

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 180 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ⅝ in. and smaller	75
Upset hex. head cap screw, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws cut and oval point	75 and 10
Milled stude	65 and 5

STAINLESS STEEL

(18% Cr. 8% Ni. 0.08 to 0.12% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$26.00
Forging quality	31.00
Delivered Detroit	
Rerolling	$29.00
Forging quality	34.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$26.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.60c
Universal	1.60c
Sheared	1.60c

Pig Iron, Ores, Ferroalloys

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.

Base price, $49 a gross ton except at Bethlehem, where it is $51.

Price del'd Detroit is $52.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.

Uncropped, $23 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.50
Foundry, f.o.b. Connellsville Prompt	$4.25 to 5.25
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland delivered	9.25
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.55 to $1.80
Mine run coking coal f.o.b. W. Pa.	1.80 to 2.00
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.00c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.75c.
No. 4 industrial	5.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in. del'd New York	46.00
6-in., and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra.

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$18.50	$19.00	$18.00	$19.50
Bethlehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	....	18.00	....
Neville Island, Pa.	18.00	18.00	17.00	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill	17.50	18.00	17.00	....
Duluth, Minn.	18.00	18.00	....	18.50
Birmingham	13.50	....	12.50	18.00
Provo, Utah	16.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	$19.00	$19.50	$18.50	$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76	....	....
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	19.26	19.26	....	....
Indianapolis				
From Hamilton, Ohio	19.77	19.77	....	....
South Bend, Ind.				
From Chicago	19.55	19.55	....	....
Milwaukee				
From Chicago	18.50	18.50	....	....
St. Paul				
From Duluth	19.44	....	....	....
Davenport, Iowa				
From Chicago	19.26	19.26	....	....
Kansas City				
From Granite City	20.04	20.54	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.00

Johnson City, Tenn. 19.00

Del'd Chicago 24.65

GRAY FORGE PIG IRON

Valley furnace $17.50

CHARCOAL PIG IRON

Lake Superior furnace $20.50

Delivered Chicago 23.54

Delivered Buffalo 23.78

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$85.00
Domestic, 80%, seaboard, (ton lots)	92.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.25
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads	$1.25 to $1.25
Ferrotungsten, less carloads	1.30 to 1.35
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to [illegible] iron, dry Spanish or Alg.	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	24c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid, delivered*	$15.00
Tungsten, domestic scheelite, delivered	$14.50 to $15.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.25 to 13.75
No. 2 railroad wrought	14.00 to 14.50
Scrap rails	14.00 to 14.50
Rails 3 ft. and under	15.50 to 16.00
Sheet bar crops, ordinary	15.00 to 15.50
Compressed sheet steel	14.00 to 14.50
Hand bundled sheet steel	12.50 to 13.00
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.50
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels	13.00 to 13.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	13.50 to 14.00
Railr. knuckles and couplers	16.00 to 16.50
Rail coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Low phos. punchings	16.00 to 16.50
Steel car axles	17.00 to 17.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$11.75 to $12.25
Shoveling steel	11.75 to 12.25
Hydraulic comp. sheets	$10.75 to $11.25
Drop forge flashings	9.75 to 10.25
No. 1 busheling	10.50 to 11.00
Rolled carwheels	12.50 to 13.00
Railroad tires	12.50 to 13.00
Railroad leaf springs	12.50 to 13.00
Axle turnings	9.50 to 10.00
Steel couplers and knuckles	12.50 to 13.00
Coil springs	12.75 to 13.25
Axle turnings (elec. fur.)	10.50 to 11.00
Low phos. punchings	12.25 to 12.75
Low phos. plates, 12 in. and under	12.75 to 13.25
Cast iron borings	7.25 to 7.75
Short shoveling turnings	7.25 to 7.75
Machine shop turnings	6.75 to 7.25
Rerolling rails	12.50 to 13.00
Steel rails, less than 3 ft.	12.50 to 13.00
Steel rails, less than 2 ft.	13.00 to 13.50
Angle bars, steel	12.50 to 13.00
Cast iron carwheels	11.75 to 12.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.00 to 10.50

	Per Net Ton
Iron car axles	$12.75 to $13.25
Steel car axles	12.25 to 12.75
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	11.00 to 11.50

No. 2 busheling	$4.50 to	$5.00
Locomotive tires, smooth	10.50 to	11.00
Pipe and flues	5.50 to	6.00
No. 1 machinery cast	9.50 to	10.00
Clean automobile cast	9.00 to	9.50
No. 1 railroad cast	9.00 to	9.50
No. 1 agricultural cast	8.50 to	9.00
Stove plate	7.50 to	8.00
Grate bars	6.50 to	7.00
Brake shoes	8.50 to	9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.50 to	$12.00
No. 2 heavy melting steel	9.50 to	10.00
No. 1 railroad wrought	....	11.00
Bundled sheets	....	9.50
Hydraulic compressed, new	....	10.00
Hydraulic compressed, old	8.50 to	9.00
Machine shop turnings	....	7.50
Heavy axle turnings	10.00 to	10.50
Cast borings	5.50 to	6.00
Heavy breakable cast	11.50 to	12.00
Stove plate (steel works)	....	9.50
No. 1 low phos. heavy	15.00 to	15.50
Couplers and knuckles	14.50 to	15.00
Rolled steel wheels	14.50 to	15.00
No. 1 blast furnace	5.50 to	6.00
Spec. iron and steel pipe	9.50 to	10.00
Shafting	16.00 to	16.50
Steel axles	....	14.50
No. 1 forge fire	....	11.00
Cast iron car wheels	....	13.00
No. 1 cast	13.00 to	13.50
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	....	13.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.00 to	$12.50
No. 2 heavy melting steel	11.50 to	12.00
Compressed sheet steel	11.50 to	12.00
Light bundled sheet stampings	8.50 to	9.00
Drop forge flashings	11.50 to	12.00
Machine shop turnings	9.00 to	9.50
Short shoveling turnings	9.00 to	9.50
No. 1 busheling	11.00 to	11.50
Steel axle turnings	10.00 to	10.50
Low phos. billet crops	14.50 to	15.00
Cast iron borings	8.75 to	9.25
Mixed borings and short turnings	9.00 to	9.50
No. 2 busheling	9.00 to	9.50
No. 1 cast	11.00 to	11.50
Railroad grate bars	7.50 to	8.00
Stove plate	7.00 to	7.50
Rails under 3 ft.	15.00 to	15.50
Rails for rolling	17.00 to	17.50
Railroad malleable	12.00 to	12.50
Cast iron carwheels	....	12.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$13.00 to	$13.50
No. 2 heavy melting scrap	....	12.00
Scrap rails	12.25 to	12.75
New hydraul. comp. sheets	....	12.00
Old hydraul. comp sheet	....	11.00
Drop forge flashings	....	12.00
No. 1 busheling	....	12.00
Hvy. steel axle turnings	10.00 to	10.50
Machine shop turnings	7.00 to	7.50
Knuckles and couplers	14.50 to	15.00
Coil and leaf springs	14.50 to	15.00
Rolled steel wheels	14.50 to	15.00
Low phos. billet crops	14.50 to	15.00
Short shov. steel turnings	8.50 to	9.00
Short mixed borings and turnings	8.50 to	9.00
Cast iron borings	8.50 to	9.00
No. 2 busheling	7.50 to	8.00
Steel car axles	13.00 to	13.50
Iron axles	13.00 to	13.50
No. 1 machinery cast	13.00 to	13.50
No. 1 cupola cast	12.00 to	13.00
Stove plate	10.25 to	10.75
Steel rails, 3 ft. and under	14.50 to	15.00
Cast iron carwheels	12.50 to	13.00
Industrial malleable	12.50 to	13.00
Railroad malleable	12.50 to	13.50
Chemical borings	10.00 to	11.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	....	$10.00
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plates	$7.00 to	7.50
Steel axles	10.50 to	11.00
Iron axles	10.50 to	11.00
No. 1 railroad wrought	....	7.00
Rails for rolling	....	10.50
No. 1 cast	9.00 to	9.50
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem.	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$10.00 to	$10.50
No. 1 heavy melting	9.50 to	10.00
No. 2 heavy melting	9.25 to	9.75
No. 1 locomotive tires	9.50 to	10.00
Misc. stand.-sec. rails	9.50 to	10.00
Railroad springs	11.50 to	12.00
Bundled sheets	6.50 to	7.00
No. 1 railroad wrought	9.50 to	10.00
No. 1 busheling	7.00 to	7.50
Cast iron borings and shoveling turnings	5.25 to	5.75
Rails for rolling	11.00 to	11.50
Machine shop turnings	5.25 to	5.75
Heavy turnings	6.00 to	6.50
Steel car axles	10.50 to	11.00
Iron car axles	13.50 to	14.00
No. 1 railroad wrought	6.00 to	6.50
Steel rails less than 3 ft.	12.50 to	13.00
Steel angle bars	10.00 to	10.50
Cast iron carwheels	9.50 to	10.00
No. 1 machinery cast	10.00 to	10.50
Railroad malleable	9.75 to	10.25
No. 1 railroad cast	9.00 to	9.50
Stove plate	6.50 to	7.00
Agricult. malleable	9.00 to	9.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.00 to	$8.25
Scrap T rails	8.00 to	8.25
No. 2 steel	6.50 to	7.00
Breakable cast	6.50 to	7.00
Machine shop turnings	4.00 to	4.50
Bundled skeleton, long	6.00 to	6.50
Forge flashings	5.50 to	6.00
Blast furnace scrap	2.75 to	3.00
Shafting	11.00 to	11.25
Steel car axles	10.50 to	11.00
Wrought pipe	5.00 to	5.25
Cast iron borings, chemical	8.50 to	9.00

Per gross ton delivered consumers' yards:

Textile cast	$10.00 to	$10.50
No. 1 machinery cast	10.00 to	10.25
Stove plate	7.00 to	7.25
Railroad malleable	11.00 to	11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.00 to	$9.50
No. 2 heavy melting steel	7.00 to	8.00
Heavy breakable cast	8.00 to	8.25
No. 1 machinery cast	....	8.50
No. 2 cast	7.00 to	7.50
Stove plate	....	6.00
Steel car axles	10.50 to	10.75
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	6.50 to	7.00
Spec. iron and steel pipe	5.75 to	6.00
Forge tire	$5.50 to	$6.00
Rails for rerolling	9.00 to	9.25
Short shoveling turnings	3.00 to	4.00
Machine shop turnings	3.50 to	4.00
Cast borings	4.50 to	4.75
No. 1 blast furnace	2.50 to	4.00
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	5.00 to	5.50

Per gross ton, delivered local foundries:

No. 1 machinery cast		$12.00
No. 1 hvy. cast (cupola size)		10.50
No. 2 cast		9.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$8.75 to	$9.50
Scrap rails for melting	9.50 to	10.00
Loose sheet clippings	5.75 to	6.25
Bundled sheets	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Machine shop turnings	6.00 to	6.50
No. 1 busheling	7.00 to	7.50
No. 2 busheling	4.00 to	4.50
Rails for rolling	10.00 to	10.50
No. 1 locomotive tires	9.50 to	10.00
Short rails	12.25 to	12.75
Cast iron carwheels	8.75 to	9.25
No. 1 machinery cast	10.00 to	10.50
No. 1 railroad cast	9.50 to	10.00
Burnt cast	7.00 to	7.50
Stove plate	7.00 to	7.50
Agricultural malleable	9.00 to	9.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$9.50 to	$10.00
Borings and short turnings	7.50 to	8.00
Long turnings	6.75 to	7.25
No. 1 machinery cast	11.00 to	11.50
Automotive cast	12.00 to	12.50
Hydraul. comp. sheets	10.00 to	10.50
Stove plate	8.00 to	8.50
New factory busheling	8.75 to	9.25
Old No. 2 busheling	5.75 to	6.25
Sheet clippings	7.00 to	7.50
Flashings	8.25 to	8.75
Low phos. plate scrap	10.00 to	10.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	3.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.05c.
Structural shapes	3.05c.
Soft steel bars and small shapes	2.85c.
Reinforcing steel bars	3.00c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands, under ¼ in.	3.10c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.70c.
Hot-rolled sheets (No. 10)	2.85c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.25
Wire, black, soft ann'l'd, base per 100 lb.	*2.575c.
Wire, galv. soft, base per 100 lb.	*2.925c.
Common wire nails, per keg	*2.557c.
Cement coated nails, per keg	*2.557c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plate sand structural shapes	3.10c.
Soft steel bars	2.90c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.40c.
Flats and squares	3.40c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.20c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.30c.
Hot-rolled sheets (No. 10)	2.85c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3c.
Rivets, boiler (keg lots)	3.10c.

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex., tap or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.75
Com. wire nails, base per keg	2.70c.
Cement c't'd nails, base per keg	2.70c.

NEW YORK

	Base per Lb.
Plates	3.30c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.17c.
Iron bars	3.24c.
Iron bars, swed. charcoal	6.50 to 7.25c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	4.00c.
Hoops	3.42c.
Bands	3.42c.
Hot-rolled sheets (No. 10)	3.17c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.30c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, 1 x ½ in. and larger	3.50c.
Open hearth spring steel, bases	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.00

	Per Cent Off List
Machine bolt, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50

	Per 100 Ft.
Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.34c.
Bars, soft steel or iron	3.14c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Galv. sheets (No. 24)	4.54c.
Hot-rolled sheets (No. 10)	3.19c.
Black corrug. sheets (No. 24)	3.99c.
*Galv. corrug. sheets	4.59c.
Structural rivets	3.59c.
Boiler rivets	3.69c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.75c.
*Structural shapes	2.75c.
*Soft steel bars, small shapes, iron bars (except bands)	2.75c.
‡Reinforc. steel bars, sq. twisted and deformed	2.505c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.30c.
*Steel bands, No. 12 to 3/16 in., incl.	3.05c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.40c.
†Galvanized sheets (No. 24)	4.00c.
*Hot-rolled annealed sheets (No. 10)	2.95c.
Diam. pat. floor plates, ¼ in.	4.75c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.21c.
Soft steel bars	2.90c.
Reinforc. steel bars	2.90c. to 3.50c.
Cold-finished steel bars	3.40c.
Flat rolled steel under ¼ in.	3.26c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.76c.
Galvanized sheets (No. 24)	4.36c.
Hot-rolled sheets (No. 10)	3.01c.
Black ann'l'd wire, per 100 lb.	$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.45

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.30c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.35c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.45c.
Hot-rolled sheets (No. 10)	3.10c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, 1-in., per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.89
4-in.	41.68
Lap-welded steel boiler tubes, 2-in.	16.61
4-in.	38.72

BUFFALO

	Base per Lb.
Plates	3.27c.
Struc. shapes	3.15c.
Soft steel bars	2.95c.
Reinforcing bars	1.95c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	5.35c.
Hot-rolled annealed sheets (No. 24)	3.65c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.42c.
Galv. sheets (No. 24)	4.25c.
Bands	3.32c.
Hoops	3.32c.
Hot-rolled unannealed sheets	3.07c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.13c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	3.50c.	3.40c.	3.40c.
Shapes, standard	3.50c.	3.40c.	3.40c.
Wide-flanged beams and columns	3.70c.	3.60c.	3.60c.
Soft steel bars	3.55c.	3.40c.	3.40c.
Reinforcing bars	2.35c.	2.35c.	2.35c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.15c.	4.25c.
Hot rolled sheets (No. 10)	3.75c.	3.65c.	3.65c.
Galv. sheets (No. 24)	4.85c.	4.75c.	4.85c.
Struc. rivets, ½ in. and larger	6.25c.	6.00c.	5.90c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg	$3.35	$3.25	$3.45
less carload			

All items subject to differentials for quantity.

Foundry Coke Reduced At Cincinnati

CINCINNATI, March 20.—Temporary removal of the Government's pressure for a 30-hr. week has restored confidence among district melters, stimulating pig iron purchases of about 1500 tons. One central Ohio consumer bought 1000 tons of Northern foundry iron, while another Ohio melter took 150 tons, all for second quarter shipment.

Coke

Announcement of new prices on by-product foundry coke, following freight rate changes, reveals a general reduction in delivered prices. The Connellsville base has been abandoned and rates on Ashland coke are based on an Ashland quotation for delivery in Cincinnati. Lower river points in southern Indiana, and northern Kentucky will be quoted on a Birmingham basis, while northern Indiana points will be sold on a Chicago basis. In eastern Ohio, prices will be adjusted to competition. The new Cincinnati delivered price will be $9.30, as contrasted with the former price of $9.53. Other prices are: Hamilton, $9.40; Dayton, $9.40; Springfield, $9.30; Richmond, Ind., $9.60; and Indianapolis, $8.75. Birmingham coke will continue at 50c. under the Ashland delivery price, making this grade quotable at $8.80, Cincinnati. Since the coal code expires the end of this month, some doubt as to the permanence of these prices is expressed.

Steel

Sheet demand continues to support output at 60 per cent of mill capacity. Automotive specifications are tending downward, but this is offset by heavier ordering from household equipment manufacturers and a revival of jobbing interest. Second quarter ordering has not started in substantial amounts.

Scrap

The scrap market is quiet. Easing of demand in the Valleys is contributing a weaker undertone to this district. Prices are steady.

Scrap Lower at St. Louis

ST. LOUIS, March 20.—Increased offerings of scrap iron by railroads and country dealers, plus a decline of $1 a ton in the Chicago and Ohio Valley markets, have caused a much easier tone here, and prices are lower. Some distress scrap is appearing. The mills in the district are said to be well supplied with material and are inclined to reduce inventories.

While the melt of pig iron in the St. Louis industrial district is reported to be increasing and foundries generally are busy, there is a disposition to withhold buying, since second quarter prices have been established on the same basis as the first. However, buying is better than recently. Washing machine manufacturers in Illinois and Iowa are especially active.

McClintic-Marshall Corpn.'s bid of $676,277 was low for the electric welded steel pipe required for a pressure conduit for the St. Louis municipal waterworks, which includes 46,895 lineal feet of 60-in. pipe, 11,015 lineal feet of 54-in. and 9985 ft. of 48-in. pipe. Bids were opened last Friday.

McClintic-Marshall Corpn. and the Marietta Mfg. Co. are the respective low bidders on pontoons and dredge pipe, requiring 900 tons of structural steel, and dredges, requiring 3100 tons, for the United States Engineer's Office at Kansas City.

Gardner-Denver Co. had net income in 1933 of $95,777, after taxes, interest, depreciation and other charges. This compares with net loss of $353,340 in 1932.

THEY ALL SAY ...

"The new

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STEEL CHART

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Whether your steel problem involves a question of Machinability . . . Cold Forming . . . Carbonizing . . . Machining and Hardening . . . Heat-Treating for Strength or Hardness . . . You will find the key to its solution in this new steel chart.

Also shown is a complete table of weights per lineal foot of all standard sizes and shapes . . . SAE specifications on Automotive Steels . . . as well as complete Metallurgical Conversion Tables. If you have not received your copy, —write now.

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Manufacturers of

COLD DRAWN STEELS

Turned and Polished Shafting, Turned and Ground Shafting

Fabricated Structural Steel

Awards in Good Volume—New Projects Higher

LETTINGS of 29,200 tons are the second largest for any week this year and compare with 14,800 tons last week. Outstanding awards are 5540 tons for the municipal auditorium at Kansas City, Mo., 5000 tons for the Hillside Housing Development in New York and 3785 tons for a bridge at Cairo, Ill., for the Illinois Central Railroad. Of new projects totaling 21,400 tons, 10,000 tons will be required for the Stacy Park reservoir at St. Louis, and 5000 tons for a power plant at Boulder Dam, on which bids will be taken April 5. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Holyoke, Mass., 250 tons, post office to unnamed fabricator.

Northampton, Mass., 175 tons, State hospital power house to G. Haarmann & Co.

Salem, Mass., 100 tons, hanger, to an unnamed bidder.

Naugatuck, Conn., 120 tons, industrial building, to Victor Tamey & Co.

New York, 5000 tons, Hillside Housing Development, to American Bridge Co.

Rome, N. Y., 190 tons, State hospital power house, to Syracuse Engineering Co.

Syracuse, N. Y., 475 tons, municipal stadium, to Syracuse Engineering Co.

Fort Jay, N. Y., 120 tons, Government building, to New York Steel Corpn.

York County, Pa., 480 tons, highway bridge, to Phoenix Bridge Co.

Richmond Hills, N. Y., 255 tons, State highway project, to National Bridge Works.

Long Island Railroad, 525 tons, bridges at Glendale and Amityville, N. Y., to McClintic-Marshall Corpn.

Sayre, N. J., 2000 tons, plant for Titanium Pigment Co., to American Bridge Co.

Central Railroad of New Jersey, 240 tons, bridge at Elizabeth, N. J., to Phoenix Bridge Co.

Colora, Md., 280 tons, State highway project, to Fort Pitt Bridge Works Co.

Baltimore, 255 tons, arts and science building for University of Maryland, to Dietrich Brothers.

THE SOUTH

Waynesboro, Va., 155 tons, highway bridge, to Virginia Bridge & Iron Co., Inc.

Clarksburg, W. Va., 200 tons, building for Pittsburgh Plate Glass Co., to Pittsburgh Bridge & Iron Co.

CENTRAL STATES

Detroit, 845 tons, Woodward Avenue grade crossing elimination for Grand Trunk and Wabash railroads, to American Bridge Co.

Dayton, Ohio, 200 tons, technical data building for Wright Field, to Pittsburgh Bridge & Iron Co.

Chicago, 800 tons, addition to Davis department store to an unnamed bidder.

Indianapolis, 2600 tons, block department store; contract to Central States Bridge & Structural Co., which has sublet 1000 tons to American Bridge Co. and 1600 tons to Illinois Steel Co. and Carnegie Steel Co.

Henry, Ill., 1500 tons, bridge, to McClintic-Marshall Corpn.

State of Illinois, 825 tons; 525 tons to Vincennes Bridge Co., 300 tons to Illinois Steel Bridge Co.

Cairo, Ill., 3785 tons, Illinois Central bridge, to American Bridge Co.

Pocohontas, Ill., 462 tons, highway bridge, to American Bridge Co.

Finlayson, Minn., 165 tons, bridge, to American Bridge Co.

State of Missouri, 250 tons, bridges to St. Louis Structural Steel Co.

Kansas City, Mo., 5540 tons, municipal auditorium, to Kansas City Structural Steel Co.

WESTERN STATES

Acadia, Cal., 950 tons, racing plant, to Consolidated Steel Corpn.

Pearl Harbor, T. H., 450 tons, four cranes, to Star Iron & Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Newburyport, Mass., 180 tons, State bridge.

Syracuse, N. Y., 450 tons, municipal baseball stadium.

Camden, N. J., 2500 tons, contract No. 2 for Camden approach subway, Philadelphia-Camden bridge; bids April 6.

THE SOUTH

State of Kentucky, 360 tons, highway construction in Johnson County.

State of Texas, 225 tons, bridges.

CENTRAL STATES

Detroit, 200 tons, addition to axle plant for Chevrolet Motor Co.

Paulding County, Ohio, 150 tons, highway bridge, Sunday & Cantell, Antwerp, Ohio, low bidder on general contract.

Cleveland, 250 tons, Erie grade crossing elimination at North Randall; Lowensohn Construction Co., Cleveland, low bidder.

Minneapolis, 400 tons, University of Minnesota athletic building.

St. Paul, Minn., 350 tons, gymnasium.

Cedar Rapids, Iowa, 300 tons, building.

Palisades, Ill., 250 tons, highway bridge.

St. Louis, 10,000 tons, Stacy Park reservoir.

WESTERN STATES

State of Colorado, 400 tons, highway bridges.

Boulder Dam, 5000 tons, power plant; bids to be taken April 5 by Bureau of Reclamation, Denver.

San Francisco, 500 tons, pier extension

Portland, Ore., 1000 tons of piling, Bonneville cofferdam.

FABRICATED PLATE

AWARDS

Vicksburg, Miss., 320 tons, barge for United States Engineer office, to McClintic-Marshall Corpn.

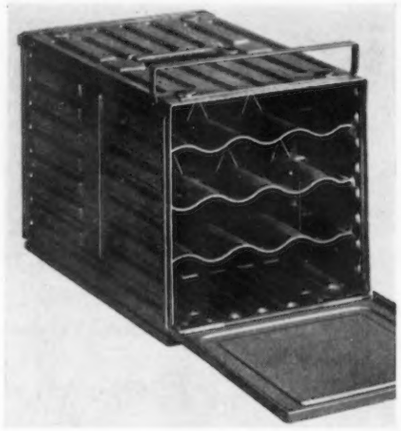
NEW PROJECTS

Temple, Tex., 325 tons, tank.

Manufactures Steel Beer Bottle Container

PRESSED steel beer bottle containers that lower both storage and haulage costs are now being manufactured by the Pines Winterfront Co., Chicago. They are made of No. 22 black sheets and weigh only 12 lb. each. Outside surfaces are enameled and inside surfaces are rust proofed. The two hinged end doors drop down to provide a clear passageway through the container, thereby facilitating keeping it in a sanitary condition.

The container is designed to hold the customary 24 bottles, but measuring only 15¾ x 10 x 10¼ in., it contains 865 cu. in. less space than the standard wooden case. One-third more steel containers can be loaded on a truck or in a railroad car and one man can carry two steel cases at a time. A false wooden base permits handling on any type of conveyor.



Although the cost of the new steel container is about double that of the old type wooden cases, the life of the steel unit is estimated at about three times that of the wooden product.

Bradshaw & Co., 530 Fourth Avenue, Pittsburgh, have been appointed representatives for the DeWolf Furnace Corpn., Rochester, N. Y., to handle steel supported, air cooled or insulated walls and arches for power plants and industrial plant uses in western Pennsylvania, eastern Ohio and West Virginia.

Meter Devices Co., Canton, Ohio, manufacturer of meter testing devices, has moved into new factory and offices at 1001 Prospect Avenue S. W., Canton. New location consists of 2-story, fireproof, brick structure, equipped with modern machinery, permitting greater efficiency of production.

Carboloy Tools.—Carboloy Co., Inc., Detroit. Booklet illustrating the company's facilities for making Carboloy tools and also the wide variety of tools made in the plant. These include solid-shank tools, reamers, spot facers, drills, counterbores, and forms and grooving tools. Savings reported by users are cited.

Reinforcing Steel

Awards 2150 Tons—New Projects 3725 Tons

AWARDS

Northampton, Mass., 185 tons, boiler house, to Kalman Steel Corpn.

Boston, 100 tons, parcel post building foundations, to Concrete Steel Corpn.

Buffalo, 600 tons, additions to plant of Eastern States Milling Co., to Kalman Steel Corpn.

Vancouver, Wash., 985 tons, grain elevator to Pacific Coast Steel Corpn.

Alameda, Cal., 270 tons, wharf and highway work, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Newburyport, Mass., 195 tons, State bridge.

Cleveland, 230 tons, Brook Park culverts.

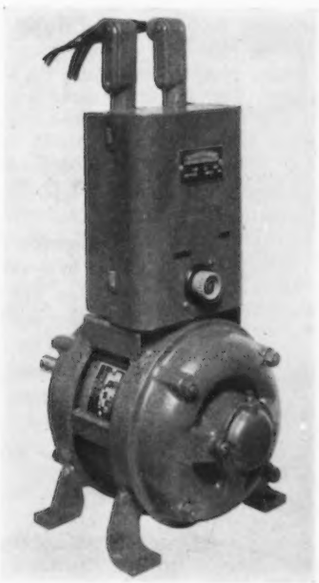
Chicago, 400 tons, additions to the 126th Street plant of Sanitary District.

Denver, 2900 tons, for Bureau of Reclamation.

Motor Self-Protected Against Burning Out

A NEW motor having a protective device built into the windings to prevent burning out has been announced by the Lincoln Electric Co., Cleveland. Should the motor be stalled through overloading, become excessively hot due to poor ventilation, should it run on single phase or if for any other reason it is blocked, the protector shuts off the current and saves the motor from damage.

It is stated that with the protective device, less supervision of motors is necessary, repair bills are reduced, and smaller size motors frequently can be used. Where large motors are necessary to take care of only infrequent peak loads, a small size self-protected motor may be employed. At the high peak loads the protector will automatically disconnect the motor.

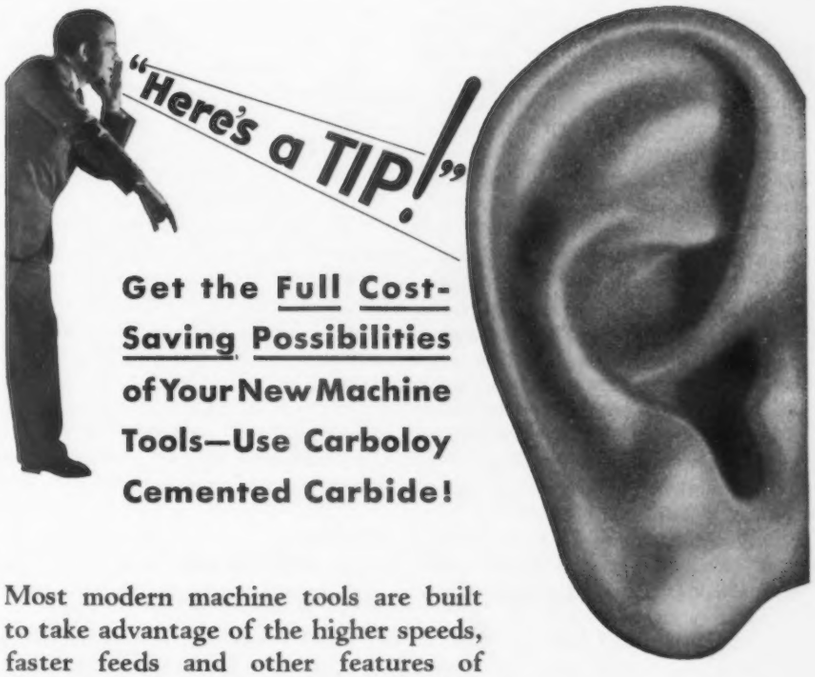


Alternating current induction self-protected Lincoln motors are built in sizes from ½ to 30 hp., for either two or three phase, and standard commercial cycles and voltages. Controls are mounted on the motors.

Light-Duty All-Wood Truck Wheels

THE METZGAR CO., Grand Rapids, Mich., has added to its line of end-wood protective-tread wheels and casters a light-duty wheel built up of a number of hard maple wedges, as shown. It is stated that by a special waterproof gluing process, use of rivets, plates and other metal parts has been eliminated. Diameters range from 2½ to 10 in. inclusive. The face-width, hub length and axle bore may be of any dimension to suit requirements, and the wheels can be furnished

with either plain oilless end-wood or with ball bearings. Easy rolling, quiet operation, shock absorption and long life are claimed for these wooden wheels.



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Most modern machine tools are built to take advantage of the higher speeds, faster feeds and other features of cemented carbide tools. By using Carboloy tools, you obtain these full cost-saving possibilities of your new machines.

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(No. 3 of a series published in the interest of machine tool buyers and sellers)

Boulder Dam Trailer Is Largest Yet Built

THE largest trailer ever built, having a load capacity of 185 tons and tare weight 41 tons has been delivered to the Boulder Dam site for the purpose of hauling sections of the penstock main headers from Babcock & Wilcox Co.'s fabricating plant to the cableway which spans the canyon, a distance of 1½ miles. The trailer was furnished by the C. R. Jahn Co., Chicago, Ill., designed and built in the shops of the La Crosse Boiler Co., La Crosse, Wis., in collaboration with the Bendix-Westinghouse Automotive Air Brake Co., Ingersoll Rand Co., Northern Pump Co., and Goodyear Tire & Rubber Co.

This machine consists of a fabricated steel frame, is equipped with air brakes, has hydraulic steering, and meets the condition of traveling the narrow road and sharp curves by separate control of the wheels on either side of the trailer. The basic structure consists of a frame built on two 33 in. beams on which are mounted axles and wheels, oil pump, steering mechanism, and air compressor. The overall length is 37 ft. 8 in. The overall width, 22 ft. The axles are spaced 14 ft. 9 in. center to center. The frame is supported by 16 wheels mounted on eight axles, two on each side at each end. There are four wheels on each side at each end, carrying eight 28 x 14 Goodyear tires, making a total of 32 tires on the trailer. This provides 448 in. of tire width distributed over 16 wheels, providing 28 in. of tire per wheel. This is necessary, as with a possible maximum load of 185 tons each tire may at times be called upon to carry 14,000 lb. or more.

Enormous Tire Capacity

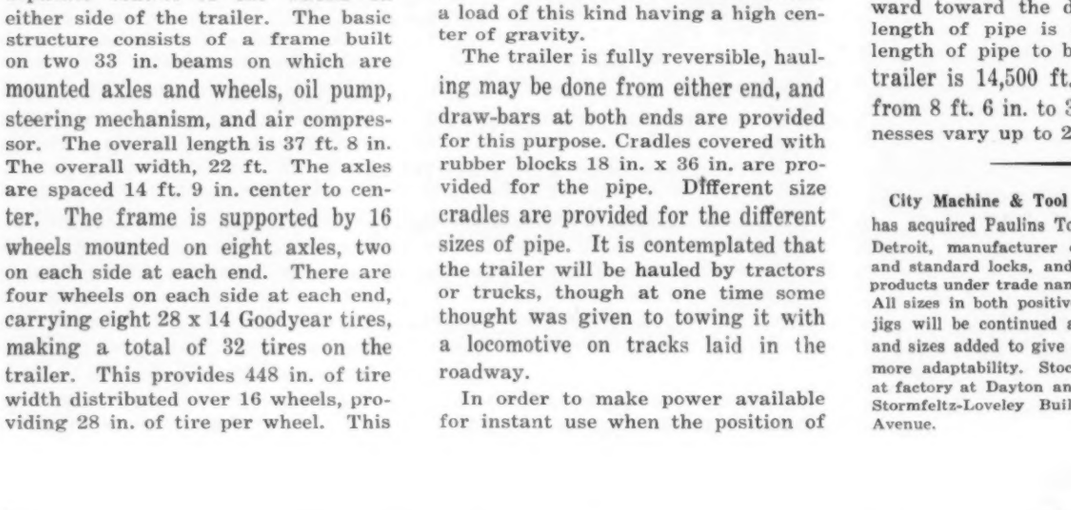
The capacity of each tire is 10,200 lb., which with an overload allowance of 25 per cent because of the slow speed at which the trailer will travel, assures a maximum total tire capacity of 407,725 lb. Wheels are mounted on oversized Timken bearings, two to each wheel lubricated by high-pressure grease system. Dual axles placed in tandem are mounted on turntables on the main beams. These axles are of the tilting, oscillating type. This balances the load and will care for any normal obstruction to be encountered on the road without materially disturbing the platform level, which is essential with a load of this kind having a high center of gravity.

The trailer is fully reversible, hauling may be done from either end, and draw-bars at both ends are provided for this purpose. Cradles covered with rubber blocks 18 in. x 36 in. are provided for the pipe. Different size cradles are provided for the different sizes of pipe. It is contemplated that the trailer will be hauled by tractors or trucks, though at one time some thought was given to towing it with a locomotive on tracks laid in the roadway.

In order to make power available for instant use when the position of the wheels changes to meet road conditions, it was essential that constant equalized pressure be maintained on hydraulic cylinders. It was not desirable that the power for steering and for the brakes come from the same source. The perfected plan utilized a 15 hp. gasoline engine driving an oil pump direct. This pump supplies a constant equalized pressure to the hydraulic cylinders, of which there is one for each set of four wheels. The steering action is controlled by a steering wheel which actuates a control valve. This wheel is mounted on a platform at one end of the trailer. The pump has a capacity of 50 gal. of oil per min. at 300 lb. pressure. It is driven by a 15 hp. gasoline engine and the combined unit is mounted on the left-hand side of the trailer as close as possible to the control valve.

The 1½-mile road over which this trailer will be hauled has maximum grade of 6½ per cent with about 28 ft. of available riding surface. Its surface is oil treated and it has one curve of 100 ft. on center line and about 210 deg. central angle. The grade on the curve is 4 per cent downward toward the dam. The longest length of pipe is 24 ft. The total length of pipe to be handled by this trailer is 14,500 ft. Diameters vary from 8 ft. 6 in. to 30 ft. Plate thicknesses vary up to 2¾ in.

City Machine & Tool Works, Dayton, Ohio, has acquired Paulins Tool & Engineering Co., Detroit, manufacturer of standard drill jigs and standard locks, and is now making these products under trade name of Cimatool-Paulins. All sizes in both positive lock and spring type jigs will be continued and several new styles and sizes added to give greater range size and more adaptability. Stocks will be maintained at factory at Dayton and at Detroit office, 410 Stormfeltz-Loveley Building, 7310 Woodward Avenue.



▲ ▲ ▲

This trailer was tested by a net load exceeding 194 tons. The trailer weighs 41 tons, making the gross load more than 235 tons.

▼ ▼ ▼

Scrap Trade Given NRA Representative

DR. N. I. STONE, New York, will serve as the NRA representative on the code authority for the Scrap Iron and Steel trade, and also as NRA representative on the other commodity code authorities included in the code, for the scrap iron, non-ferrous scrap metal, and waste material trade. Dr. Stone was formerly chief economist and statistician of the United States Tariff Board; chief of the foreign tariff division of the Department of Commerce, chairman of the arbitration committee of the cleaning and dyeing industry, appointed by Governor Lehman of New York.

The code for the scrap iron trade will be under the direct supervision of Assistant Deputy Administrator O. J. Libert, in the distributing trade section of the NRA, of which Dr. Dameron is the deputy administrator.

Data On Manufacturing In January 1934

NEW YORK, March 20.—Compared with a year ago, employment in manufacturing industry in January was 21.3 per cent higher; production, 19.0 per cent; man-hours, 11.7 per cent; payrolls, 34.9 per cent, and gross income, 37.3 per cent. The output per worker was 1.8 per cent less, but the output per man-hour was 6.5 per cent more. Labor cost per man-hour was 20.9 per cent higher, and cost per unit of product, 13.3 per cent higher, while labor cost in relation to gross income was 1.7 per cent lower. These are the results of the preliminary calculations by the National Industrial Conference Board of certain indexes of manufacturing changes.

Compared with the average of the years 1923-1925, the primary elements of manufacturing activity were still at low levels in January. Production stood at 75 per cent of 1923-1925; employment, at 70.5 per cent; man-hours, at 50.5 per cent; payrolls, at 52.9 per cent; and gross income, at 58.5 per cent. Output per worker, however, had increased to 106.4 per cent of the earlier level, and output per man-hour, to 148.5 per cent.

Labor cost per man-hour, which in June, 1933, had sunk to 81.3 per cent of the 1923-1925 standard, had risen in January to 104.8 per cent of the former standard. Labor cost per unit of product, though considerably higher than in June, 1933, was 29.5 per cent lower than in 1923-1925. In relation to income received from the sale of manufactured products, the cost of labor was 90.4 per cent of its level in 1923-1925.

The year 1933 was one of varied changes. From the low point in March, output per worker rose with increasing hours through June, but later declined with the diminishing hours per week. Output per man-hour followed a similar course, but with the increase of employment in the later months of the year and the hiring of less experienced wage personnel, it dropped toward the end of the year. Labor cost per man-hour declined slightly from January to June then rose, as a result of the minimum wage policy of the National Recovery Administration.

Labor cost per unit of product and in relation to gross income fell until midsummer. Later the former ratio rose, as a result of increased labor costs, and the latter rose, as a result of advancing price.

Production always falls off in December, and diminished output is reflected in increased labor costs per unit of product and in relation to gross income. January shows the beginning of the emergence from this seasonal decline in production.

Pennsylvania Places Large Castings Orders

THE Pennsylvania Railroad has placed orders for steel and malleable castings and other parts for freight car construction with the following companies: American Brakeshoe & Foundry Co., Pittsburgh, Baltimore and Mahwah, N. J.; American Steel Foundries, Chicago and Indiana Harbor, Ind.; Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Buckeye Steel Casting Co., Columbus, Ohio; Cardwell-Westinghouse Co., Chicago and Pittsburgh; Duquesne Steel Foundry Co., Pittsburgh; Edgewater Steel Co., Pittsburgh; Gould Coupler Co., Depew, N. Y.; W. H. Miner, Chicago; National Malleable & Steel Casting Co., Cleveland; McConway & Torley Co., Pittsburgh; Pittsburgh Steel Foundry Corpn., Glassport, Pa.; Pressed Steel Car Co., McKees Rocks, Pa.; Scullin Steel Co., St. Louis; Union Steel Casting Co., Pittsburgh, and Waugh Equipment Co., Depew, N. Y. The orders totaled approximately $1,100,000.

Fabricated Bookings Lower in February

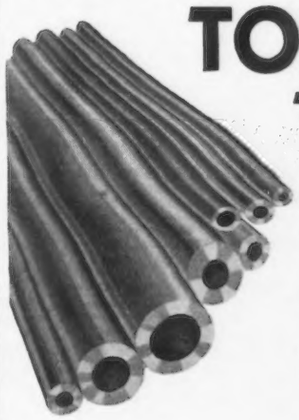
WHILE shipments of fabricated structural steel during February declined 27 per cent under January, the bookings receded only 16 per cent under the January level. Bookings during February of this year, however, were 18 per cent greater than in the same month last year, and only 7 per cent under the average monthly bookings during the last quarter of 1933. These preliminary figures are based upon reports to the American Institute of Steel Construction from approximately 70 per cent of the industry.

The tonnage ahead for future fabrication is approximately 20 per cent larger than it was at this time last year.

In his annual statement to stockholders of the New Britain Machine Co., New Britain, Conn., Herbert H. Pease, president, said that "as a result of continuous design and development work, we have placed on the market some new machines which have already found acceptance with the customers, to the extent that our present volume of unfilled orders for machines is substantially greater than at any time for several years past."

NON-SHRINK, OIL HARDENING

TOOL STEEL TUBING



The job of making ring dies, cutting dies, bushings spacers, etc., is half done when you start with Bissett Tool Steel Tubing. There is a size carried in stock to meet every requirement up to 12" O.D. and 2" wall thickness. Larger sizes can be supplied.

It eliminates forging, does away with annealing difficulties and cuts down machining cost.

We also supply special tubing to S.A.E. 52100 and S.A.E. 4615 analysis for Ball Bearing purposes.

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

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PLANT EXPANSION AND EQUIPMENT BUYING

Strike Threat Checks Machine Tool Buying

A NEW stumbling block has been placed in the path of the recovery of the capital goods industries in the form of impending labor trouble. Machine tool business during the past few days has been retarded because of the fear of a labor tie-up.

In Cincinnati inquiry for machine tools is brisk, but orders are lagging. The heavy demand for milling machines and grinders also has eased. Some undisclosed orders from foreign sources have been received, but the bulk of current single tool business is from widely scattered sources in this country. Machine tool factories in this district are running at about 30 per cent of capacity. The majority of these plants are sustaining operations to replenish stocks.

The Santa Fe Railroad has asked for prices on a 20-in. heavy duty drill press, a 6¼-in. spindle turret lathe and a 24-in. vertical turret lathe. It is probable that this carrier will ask for more tools before spring has passed.

Hurley Machine Co., Chicago, has appropriated $150,000, most of which will go for new equipment to be used in increasing the capacity of its plant which manufactures principally household utilities, such as washing machines and ironers.

There is considerable activity at the Rock Island Arsenal which is to get $410,000 for improvements. It is not now known how much of this money will go toward machine tools, although a number of proposals have been put out and machines of all types are desired.

The small tool market has been quite brisk until within the last few days when a lull has developed which can probably be traced to the labor situation.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 27 for one motor-driven belt sander machine (Schedule 1978) for Portsmouth, N. H., Navy Yard.

Great Barrington Fire District, Great Barrington, Mass., plans early call for bids for pumping machinery and accessory equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

Commercial Filters Corpn., Boston, has been organized by Merrill G. Hastings, 89 Broad Street, and associates, capital $100,000, to manufacture filter equipment and parts.

School Board, Mexico, Me., Leon B. Spinney, Redlonville, Me., chairman, plans manual training department in new senior high school. Cost $100,000. Financing is being arranged. Coombs & Harriman, 11 Lisbon Street, Lewiston, Me., are architects.

Coduri Granite Works, Westerly, R. I., Joseph Coduri, head, plans rebuilding part of granite working and finishing plant recently destroyed by fire. Loss over $70,000 with equipment.

NORTH ATLANTIC

Titanium Pigment Co., 111 Broadway, New York, a subsidiary of National Lead Co., same address, is considering purchase of about 400 acres at Sayreville, N. J., as site for new plant, to include machine shop and power house, pumping station and other structures. Initial works will occupy about 50 acres. Cost over $1,500,000.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until March 26 for open-link wrought iron buoy chain, ⅞- to 1⅝-in. diameter, and quantity of bridle chains (Proposal 45748); steel buoy shackles with split keys (Proposal 45753); until March 29, three acetylene buoys complete with illuminating apparatus except cylinders (Proposal 45665).

Gratan Architectural Iron & Bronze Co., Inc., New York, has been organized by Harry Cohen, 950 Woodycrest Avenue, Bronx, and Irving D. Margulies, 765 Eastern Parkway, Brooklyn, to manufacture ornamental iron, bronze and other metal products.

News Syndicate Co., Inc., 220 East Forty-second Street, New York, publisher of *Daily News*, has filed plans for seven-story printing plant, with several floors for storage and distribution, at 698-716 Pacific Street, Brooklyn. Cost $200,000 with mechanical-handling and other equipment. Lockwood Greene Engineers, Inc., 30 Rockefeller Plaza, New York, is architect and engineer.

Art Metal Die Cutting Co., New York, has leased space in building at 115-23 West Twenty-ninth Street for new plant.

New York Water Service Corpn., 27 William Street, New York, plans extensions in water supply system in Parkside Avenue district, Brooklyn, including pipe lines, fittings, meters, service facilities, etc. Cost about $30,000.

American Smelting & Refining Co., 120 Broadway, New York, has leased from Kildun Mining Corpn. of Mexico, gold and silver mines adjoining properties of first noted company at Santa Maria de la Paz, San Luis Potosi, Mexico, and plans development, including sinking of new working shaft with installation of hoisting, conveying, loading and other equipment. Later a new ore mill will be built, with machine shop and other mechanical units.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 27 for one motor-driven combination shear, punch and notcher machine (Schedule 1994) for Brooklyn Navy Yard; one combination booster fire engine, pump and hose car (Schedule 1983) for White Plains, N. Y.

Matthew Equipment Corpn., Brooklyn, has been organized by Samuel Kleiman, 840 Montgomery Street, and associates, to manufacture electrical fixtures and equipment.

Kiebitz Brothers, Inc., 43-58 166th Street, Flushing, L. I., manufacturer of sheet metal products, roofing, etc., has filed plans for new two-story mechanical and repair shop, 41 x 120 ft., at Northern Boulevard and 231st Street, Douglaston, L. I. Cost about $30,000 with equipment.

Continental Can Co., 1 Pershing Square, New York, has let general contract to Austin Co. of California, Los Angeles, for two-story addition to branch plant at Los Angeles, 174 x 200 ft. Cost $150,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Consolidated Engineering Co., Elizabethport, Elizabeth, N. J., has been organized by Augustus L. Alpers and Fred A. Menke, 2 South Front Street, to manufacture electric heating appliances and equipment.

Board of Public Works, South Amboy, N. J., plans installation of electric pumping machinery and accessory equipment at municipal waterworks.

Jerome S. Katz & Co., Inc., Jersey City, N. J., has been organized by Jerome S. Katz, 33 Pacific Avenue, and associates, to operate a metal works for smelting, refining, etc.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until March 27 for one gas-fired forge furnace (Req. 5095, S. & A.) and for one gas-fired blacksmith's forge, one forge furnace and two gas burners (Req. 5094, S. & A.).

Rohm & Haas Co., 222 West Washington Square, Philadelphia, manufacturer of industrial chemicals, etc., has let general contract to A. Raymond Raff Co., 1635 West Thompson Street, for three-story addition to plant at Bristol, Pa. Cost about $50,000 with equipment.

Continental Distilling Corpn., Snyder Avenue and Swanson Street, Philadelphia, has let general contract to Edward J. Bailey, Duncan and Sepviva Streets, for one-story machine shop.

Neuwiler Brewing Co., Allentown, Pa., has engaged Clarence E. Wunder, Architects' Building, Philadelphia, architect, to draw plans for new one-story bottling plant. Cost over $45,000 with equipment.

SOUTH ATLANTIC

Southern Waxed Paper Co., 480 Woodrow Street, S. W., Atlanta, Ga., manufacturer of waxed and processed papers, has let general contract to S. N. Hodges Co., 262 Rumson Road, N. E., for one-story addition, 75 x 160 ft. Cost about $40,000 with equipment.

Thomas Car Mfg. Co., High Point, N. C., has been organized by J. W. and P. A. Thomas, High Point, to manufacture industrial cars, trucks and parts.

North Carolina Mineral Development Co., Charlotte, N. C., care of A. B. Whiting, 2410 East Seventh Street, head, plans new gold-mining and gold recovery plant of several units, including mill and power station. Cost over $100,000 with equipment.

City Council, Rocky Mount, N. C., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of $310,000 is available. William C. Olsen, Raleigh, N. C., is consulting engineer.

Seventh Avenue Auto Parts Co., Inc., Miami, Fla., has been organized by Jack Moore, Safe Deposit Building, and associates, to manufacture automobile parts and equipment.

OHIO AND INDIANA

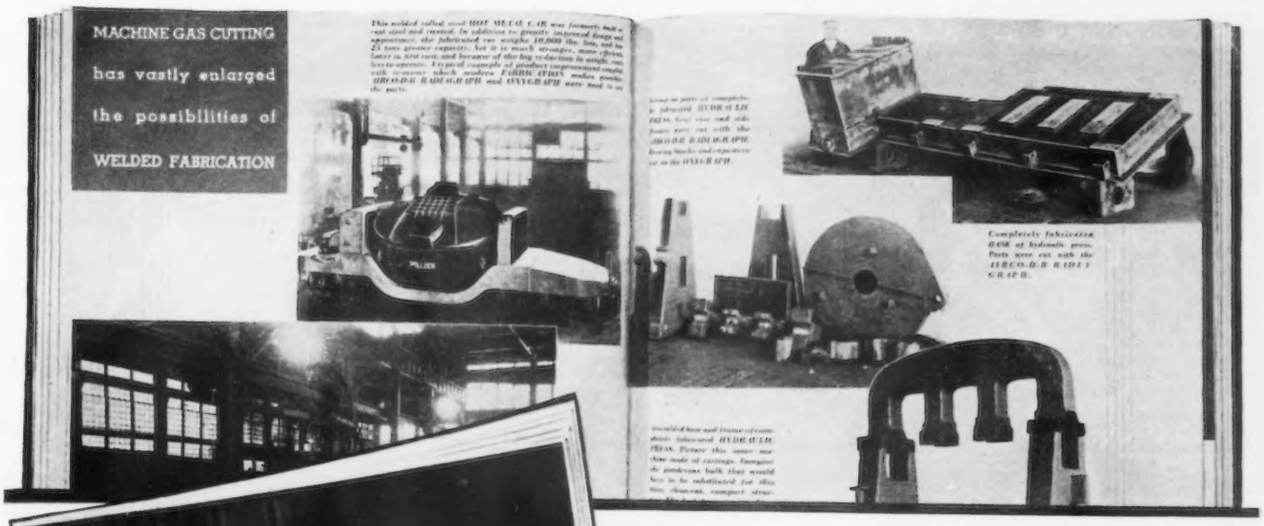
Golden Age Brewery Co., Youngstown, Ohio, recently organized, care of Clarence Kissinger, Youngstown, architect, has plans for new two-story plant, work to begin early in spring. Cost about $90,000 with equipment. N. H. Darsky, Youngstown, is president of new company.

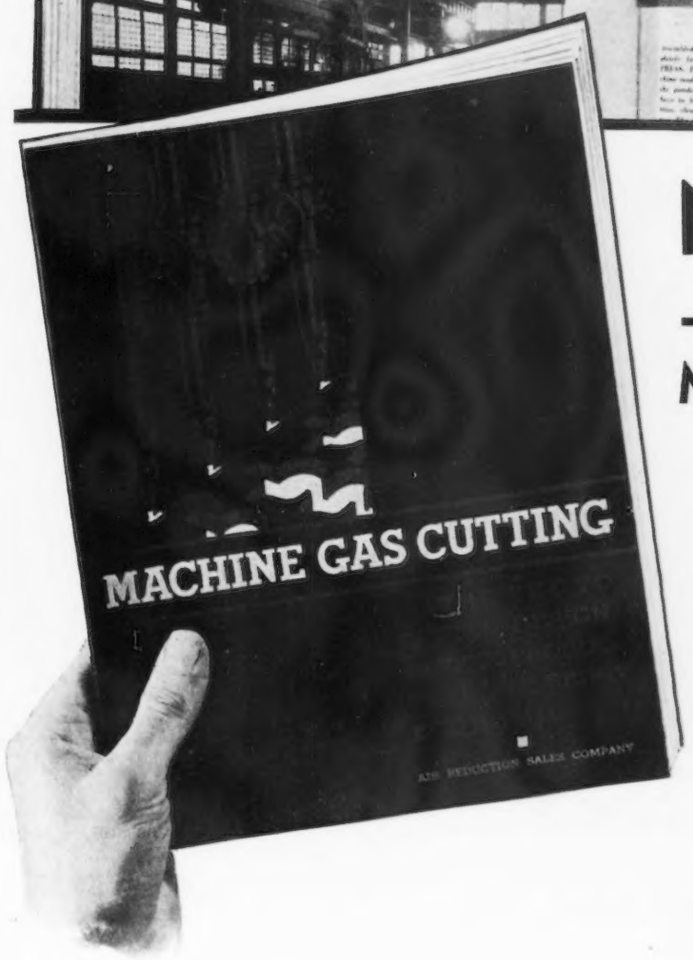
Leetonia Tool Co., Leetonia, Ohio, manufacturer of mining tools and equipment, plans one-story addition. Cost over $35,000 with equipment. Company has recently acquired site from Leetonia Electric Co.

Hamilton Automatic Stoker Corpn., Hamilton, Ohio, has been organized by John A. Wenzel and Herbert E. Weigel, Hamilton, to manufacture stokers, parts and kindred fuel-saving equipment. Company will take over organization of same name at 1600 Dixie Highway.

Eureka Tool & Die Co., 124 McDonough Street, Dayton, Ohio, has let general contract to W. E. Boren, Dayton, for one-story addition.

Village Council, Bradford, Ohio, plans new municipal electric light and power plant, using Diesel engine-generating units, and electrical





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distribution system. Cost about $84,000. Financing is being arranged.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 28 for bolts, nuts and screws (Circular 351), steel aircraft bolts and clevis bolts (Circular 348), 28,500 copper annular gaskets and 280,000 plain aluminum grommets and washers (Circular 364), six propeller blades (Circular 360); until Aprjl 3, 324 stainless steel test columns (Circular 358); until April 4, 42,000 lubricators (Circular 361).

Farmers Fertilizer Co., Windsor Avenue, Columbus, Ohio, plans rebuilding part of works recently destroyed by fire. Loss over $100,000 with equipment.

Formed Steel Products, Inc., Toledo, Ohio, recently organized by W. Meredith Ashley, 2327 Robinwood Avenue, formerly vice-president and treasurer of Toledo Wire & Iron Co., has taken over local building for manufacture of line of steel specialties, including stair treads and risers, steel partitions, metal cabinets, industrial trucks, steel hoppers, etc. Willard D. Robison and Frederick B. Schell, Toledo, are interested in new company.

Board of Public Works, Muncie, Ind., has engaged George B. Gascoigne, Leader Building, Cleveland, engineer, to draw plans for new sewage disposal works, including power station and machinery. Fund of $1,000,000 will be used for new plant and extensions in sewerage system.

Fairmount Brewing Co., Quebec Road and Westmore Avenue, Cincinnati, has plans for new five-story and basement storage and distribution plant. Cost about $200,000 with equipment. Newhouse & Bernham, 8 South Michigan Avenue, Chicago, are architects.

BUFFALO DISTRICT

International Harvester Co., 210 Teall Avenue, Syracuse, N. Y., has plans for one-story addition to agricultural implement and parts plant, about 60,000 sq. ft. floor space. Cost $125,000 with equipment. Headquarters are at Chicago.

Syracuse Fire Door Corpn., 900 Canal Street, Syracuse, N. Y., manufacturer of fireproof doors, sash, etc., plans rebuilding part of plant recently damaged by fire. Loss about $25,000 with equipment.

Utilities Foundry Corpn., Elmira, N. Y., has been organized by George A. Skelly, 108 Chestnut Street, and Lawrence S. Hess, 726 Winsor Avenue, to manufacture metal castings, tools, etc.

Dominion Diesel, Ltd., Toronto, Ont., recently organized by E. C. Fox, vice-president, Canada Packers, Ltd., Toronto, and associates, to manufacture Diesel engines, parts, etc., has leased about 5000 sq. ft. floor space in building at 26-28 Cumberland Street, for new plant. Initial operations will be given over primarily to assembling. Mr. Fox will be president of company.

Dominion Foundries & Steel Co., Ltd., Hamilton, Ont., plans expansion, including one-story addition. Cost over $30,000 with equipment.

WASHINGTON DISTRICT

American Oil Co., American Building, Baltimore, is considering new bulk oil storage and distribution plant in Curtis Bay district, including main two-story unit, 100 x 150 ft., tanks, pumping equipment, etc. Cost over $50,000 with equipment. T. J. O'Connell is company engineer.

Quartermaster, Marine Corps, Washington, asks bids until March 26 for one electric drill press and one set screw plates (Schedule 406).

General Purchasing Officer, Panama Canal, Washington, asks bids until March 29 for speed-reduction gears, car axles, gasoline-driven lawn mowers, 1000 lb. spikes, 6000 lb. steel welding rods, anchor chain, coil chain, wire welding rods, floor plates, etc. (Schedule 2949).

Bureau of Supply, Procurement Division, Treasury Department, Washington, asks bids until April 5 for electric cable and wire required for period, July-December (Class 15); hacksaw blades, dies and taps, drills, portable grinders, hammer and drill combinations, floor machines and attachments, electric hammers, tool holders, reamers, band saws, threading machines, electric polishers, etc., for same period (Class 40).

Maryland Metal Casket Co., Inc., North Street and Pennsylvania Avenue, Baltimore, has been organized by William E. and John B. Tickner to manufacture metal burial cases.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 27 for circle cutting shear (Schedule 1961-R), brake-bending machine, both motor driven (Schedule 1959-R), for Eastern and Western navy yards.

SOUTHWEST

Hirsch Distilling Co., 401 Delaware Street, Kansas City, Mo., has let general contract to James S. Cowie, 3504 Troost Street, for extensions and improvements in three-story plant, 30 x 135 ft. New machinery will be installed for rectifying, blending, etc. Cost about $65,000 with equipment. Mid-West Engineering Co., last address noted, is consulting engineer.

Klausmann Brewery, South Broadway and Lorenz Street, St. Louis, idle for some time, has been acquired by new interests, headed by Lynn Barnes, Tulsa, Okla., and associates, represented by Kendall Creecy, 2719 Tamm Street, St. Louis, consulting engineer. Property comprises 22 buildings and will be remodeled and improved, with installation of new brew-house, bottling, refrigerating, conveying and other equipment. Company will be organized to operate plant. Cost close to $1,000,000 with machinery. Engineer noted is in charge.

City Council, Cushing, Okla., plans new municipal electric light and power plant. Project has been approved at special election. Financing for $350,000 has been arranged.

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until March 27 for 12 capstans (Circular 56); until March 28, countersunk head bolts, phosphor bronze self-lubricating bushings, wrought iron snatch blocks and swivel hook, wrought iron deck pads, etc. (Circular 49); until March 29, metal pocket-type hose racks, hose, brass fire nozzles, bolts, etc. (Circular 53).

Adolph Busch, Inc., 1109 Title Guarantee Building, St. Louis, organized by Adolph Busch, and associates, has engaged George E. Wells, Inc., Security Building, consulting engineer, to draw plans for new multi-story brewery, including boiler house, machine shop and other

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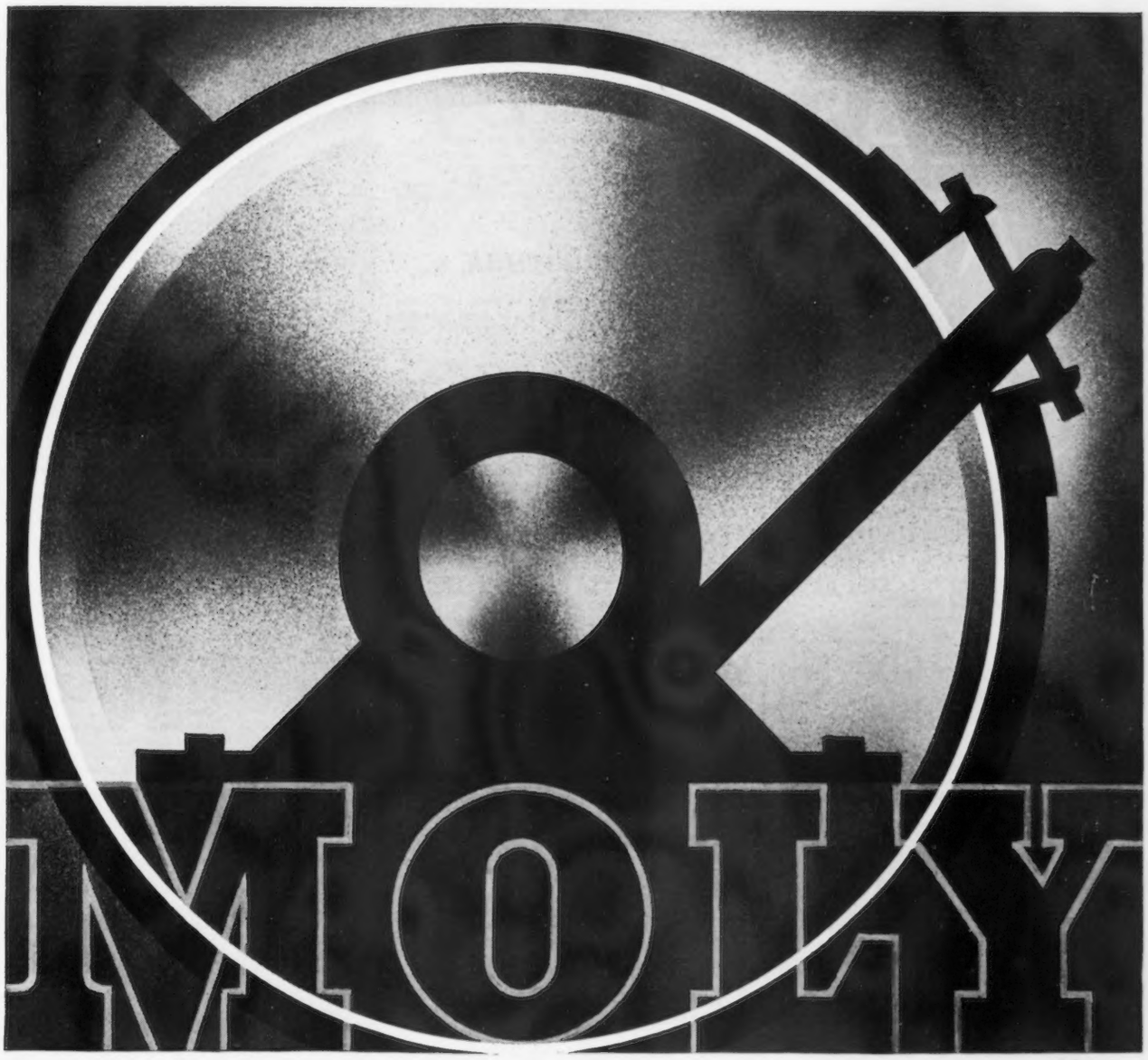

for wear . . .

GREEK meets Greek when two wearing surfaces engage each other under vise-like pressure and heavy opposing forces. The brakes on traveling cranes and other hoisting machinery furnish an example. Based on replacement costs, it is usually the drum, and not the band lining, which comes out second-best. This is true not only with ordinary carbon steel but even with most alloy-steels and irons.

It's a different story when Molybdenum is added. Under *any* formula it improves wear-resisting ferrous products. Molybdenum imparts a hardness — without brittleness — obtainable with no other combination of alloys at a competitive cost. *Comparative service tests have shown Molybdenum grey iron outlasting the usual steel drum three times with no appreciable wear as yet.* The depth hardness imparted by Moly to iron has made this application possible by affording sufficient strength to withstand the enormous torsional load.

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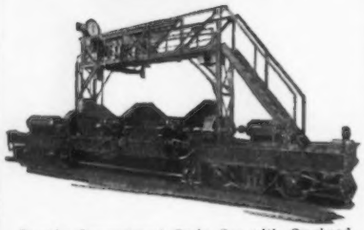
ATLAS CARS



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Atlas Patented Indicating and Recording Scales

Special Cars and Electrically Operated Cars for every conceivable purpose.

THE ATLAS CAR & MFG. CO.

Engineers - Manufacturers

1140 Ivanhoe Rd., Cleveland, O

departments. Cost about $400,000 with equipment.

Common Council, La Plata, Mo., plans new municipal electric light and power plant, using Diesel engine-generating units, and municipal electric distribution system. Fund of $100,000 is being arranged. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

High Grade Packing Co., J and Sixty-fifth Streets, Galveston, Tex., meat packer, has let general contract to J. W. Zempter & Co., 2115 F Street, for two-story addition. New power house will also be built. Cost about $45,000 with equipment.

WESTERN PENNA.

Department of Military Affairs, Capitol Building, Harrisburg, Pa., plans new armory at Pittsburgh, to include machine and gun shops, and other mechanical shop units. Entire project will cost about $900,000.

United States Engineer Office, Huntington, W. Va., asks bids until March 31 for new steel launch, 8 ft. wide and 40 ft. long (Circular 91).

United States Engineer Office, Pittsburgh, plans steel lock and dam on Tygart River, near Grafton, W. Va., in connection with flood control project, to include power house and operating station, gates, pipe lines, etc. Initial fund of $3,000,000 for program has been made available. Entire project will cost $12,000,000.

Hamburger Distillery, Ltd., Home Trust Building, Pittsburgh, will carry out expansion and improvements at plant at Brownsville, Pa., to include new equipment. Cost about $150,000 with machinery. L. E. Wirth is in charge.

Board of County Commissioners, County Office Building, Pittsburgh, asks bids until March 27 for metal sign posts, reflecting panels and signs, reflectors and parts for hexagonal reflectors. Robert G. Woodside is County controller.

MIDDLE WEST

Wilson & Co., 4100 South Ashland Avenue, Chicago, meat packers, have plans for addition, 70 x 96 ft. Cost about $70,000 with equipment. C. P. Bernat, address noted, is company architect.

Town Council, Roseville, Ill., asks bids in about a month for pumping machinery and auxiliary equipment, and steel tower for municipal water system. Wells Engineering Co., Geneva, Ill., is engineer.

Leverage Mower Co. of America, Inc., 134 North La Salle Street, Chicago, has been organized by Elbert R. Potter and John G. Lambrakis, to manufacture lawn mowers and parts.

Town Council, Milford, Iowa, plans early call for bids for new municipal electric light and power plant. Fund of $70,000 is being arranged. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, is consulting engineer.

Dold Packing Co., 6023 South Twenty-seventh Street, Omaha, Neb., meat packer, has let general contract to Parsons Construction Co., Grain Exchange Building, for extensions and improvements in one and two-story machine shop, 85 x 237 ft., with part of unit to be used for manufacture of shipping containers. Cost about $25,000 with equipment.

City Council, Kewanee, Ill., plans new municipal electric light and power plant. Fund of $997,000 is being arranged through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Crowe Name Plate Mfg. Co., 3739 North Ravenswood Avenue, Chicago, manufacturer of metal name plates and kindred specialties, has let general contract to Robert Goldie, 19 South La Salle Street, for one-story addition, 45 x 55 ft. George W. Klewer is company architect.

Lub-O-Meter, Inc., 2447 South Michigan Avenue, Chicago, has been organized by Chester D. Masters, Clifford S. Healy and associates, to manufacture measuring devices and equipment for gas and oil.

Town Council, Guttenberg, Iowa, asks bids until April 10 for equipment for new municipal electric light and power plant, including two 300-hp. Diesel engines and accessories, two 200-kw. generating units, two air compressors, two fuel oil tanks, each with capacity of 12,500 gal.; cooling system, oil reclaimer, switchboard, instruments, etc.

Quaker Oats Co., Cedar Rapids, Iowa, with headquarters at 141 West Jackson Boulevard, Chicago, plans new six-story plant at first noted place, 80 x 130 ft. Cost about $100,000 with equipment.

Stolper Steel Products Co., 3258 West Fond du Lac Avenue, Milwaukee, manufacturer of automotive and other metal stampings, has placed contract with C. A. Kleppe & Sons, 239 West Center Street, for two-story addition, 50 x 60 ft.

Oconto Brewing Co., Oconto, Wis., has plans by W. C. Weeks, Inc., architect, 720 Ontario Street, Sheboygan, Wis., for alterations, improvements and new equipment costing about $50,000.

City of Cedarburg, Wis., has been allotted Federal loan of $31,000 for sewage filteration plant. Jerry Donohue Engineering Co., 608 North Eighth Street, Sheboygan, Wis., is consultant.

SOUTH CENTRAL

Board of Aldermen, Gretna, La., asks bids until March 27 for equipment for municipal waterworks, including motor-driven centrifugal pumps and accessories, gasoline engine-driven generator set, switchboard and instruments, 250,000-gal. elevated steel tank and tower, filter equipment, pipe lines, valves, etc. Fund of $269,000 has been arranged. Swanson-McGraw, Inc., Balter Building, New Orleans, is engineer.

Louisville & Nashville Railroad Co., Louisville, has let general contract to George H. Rommel Co., Louisville, for one-story machine shop at South Louisville repair works, 170 x 420 ft., to replace unit recently destroyed by fire. Cost over $60,000 with equipment.

Corbin Brewing & Ice Co., Corbin, Ky., recently organized by Ewing Wilder and Theodore Neal, Corbin, plans new works of several units, including brew-house, bottling works, power house, ice and refrigerating plant, machine shop, etc. Cost about $200,000 with equipment. Mr. Wilder will be president.

United States Engineer Office, Memphis, Tenn., asks bids until March 27 for one six-drum cross-deck lay shaft type hauling and hoisting winch (Circular 301).

United States Engineer Office, First District, New Orleans, asks bids until March 29 for one steel oil barge, 26 ft. wide, 80 ft. long (Circular 251).

PACIFIC COAST

Firestone Battery Co. of California, 2525 Firestone Boulevard, Los Angeles, manufacturer of electric storage batteries and equipment, has let general contract to C. J. Kubach-Snyder Co., Union Bank Building, for one-story addition. Cost about $25,000 with equipment. Company headquarters are at Akron, Ohio. Claud Beelman, Union Bank Building, Los Angeles, is architect.

George H. Morrill Co., 130 Fremont Street, San Francisco, manufacturer of printing inks, has let general contract to Dinwiddie Construction Co., Crocker Building, for one-story addition to plant at 20 South Linden Street. Cost about $35,000 with equipment.

E. J. Mettler, Lodi, Cal., is at head of project to erect new winery at Victor, Cal., where site is being selected. Plant will include machine shop, power house and other mechanical departments. Cost about $100,000 with equipment. Company will be organized to carry out development.

Crown Williamette Paper Co., 2945 East Twelfth Street, Los Angeles, with headquarters at San Francisco, plans one-story addition, 150 x 200 ft. Cost over $75,000 with equipment.

General Grocery Co., 2 North First Street, Portland, has let general contract to G. H. Buckler Co., Lewis Building, for three-story storage and distributing plant, about 130,000 sq. ft. floor space. Cost about $225,000 with elevating, conveying, loading and other mechanical equipment. Sutton, Whitney & Aandahl, Lewis Building, are architects.

Mountain City Copper Co., Salt Lake City, Utah, recently organized, care of J. O. Elton, Salt Lake City, president, plans development of copper-mining properties, with installation of general mining and mill equipment. Company is arranging capital stock issue of $745,700, part of fund to be used for purpose

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with
OPEN TANK OIL QUENCHING—
and Minimum Distortion

S. A. E. 4615 as produced by Illinois Steel Company has solved many a production problem where a steel of exceptional hardness combined with ease of treatment and machining is required.

Tough cores with a deep, hard case are obtainable in this steel with a single oil quench. In machining this steel, maximum production can be maintained.

For gears, wrist pins, roller bearings and other parts subjected to high surface wear, you'll find S. A. E. 4615 an unusually economical steel. Write today for complete information and suggestions as to the applicability of this steel to your needs.

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Illinois Steel Company
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
208 South La Salle Street, Chicago, Illinois

ILLINOIS *alloy* STEEL
ALWAYS DEPENDABLE

noted. A. D. Hunter, Salt Lake City, is treasurer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 27 for 9000 lb. corrosion-resisting bar steel (Schedule 1946) for Mare Island Navy Yard.

Fentron Steel Works, Inc., Seattle, care of Robert Anderson, McDowall Building, representative, has been organized by Herbert H. and William F. Schiessl, Seattle, and associates, to manufacture steel and other metal products, particularly for building service.

MICHIGAN DISTRICT

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, steel sinks, etc., plans one-story top addition, 85 x 140 ft. Cost over $65,000 with equipment.

Brooks Appliance Co., Marshall, Mich., manufacturer of mechanical appliances and equipment, has let general contract to Rex Anderson, Marshall, for one-story addition. Cost about $24,000 with equipment.

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Write for our 102 page gear catalog.

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147 Circuit Ave.
SPRINGFIELD, MASS.

Simmons Boiler Co., 550 South Junction Avenue, Detroit, has been organized by Charles L. Simmons, 12874 Mark Twain Avenue, and associates, to manufacture boilers and other heating equipment.

Pontiac Casting Co., Pontiac, Mich., lately formed by Amos Kelly, Pontiac, and associates, has leased former one-story plant of Briscoe Device Co., and will remodel for production of metal castings, primarily for automotive service.

General Steel Treating Co., Detroit, has been organized, capital $50,000, by Peter Kypros, 606 Canto Avenue, and associates, to operate a steel-treating works. New company will take over organization of same name at 1036 Beaubien Street.

FOREIGN

Societe Industrielle des Schistes et Derives, Ltd., 6 Rue Francoia, Paris, France, plans erection of new distillation plant at Cherbourg, France, to handle lignite, peat, bituminous schist and allied products. Plant will consist of several operating units and proposes to use American-made equipment, including ovens, crushers, grinders, conveyors, condensation and absorption equipment, boilers, pumps, etc., and traveling crane. Cost over $750,000 with machinery.

Town Clerk, Queensland, Australia, asks bids until May 5 for motor-driven pumping machinery and accessory equipment, automatic control equipment, valves, fittings, etc. E. E. Harding Frew, Queen Street, Brisbane, Australia, is engineer.

Natal Railroad Co., Natal, South Africa, plans electrification of main line to Newcastle and vicinity, and electrification of branch line from Glencoe to Vryheid. Cost over $1,000,000 with equipment.

Welded Auto Loading Devices

(*Concluded from Page 29*)

cars. Its wood-working plant has been transformed into a metal-working shop where the devices not only are assembled, but also installed in freight cars. Most of the railroads prefer to have the installation work done by the manufacturer of the device rather than by inexperienced men in their own shops.

Assembly of the device requires 20 operations, most of which are welding. For instance, a forging is arc welded onto the end of the front arm, the frame is welded to the spring cage chain and the floor tubes have cover plates welded into them. Installation of the auto-loader in the freight car is largely a welding job with some 40 operations. Especial skill is necessary on the part of the welders because much of the welding is done under the roof and below the floor level. Plant equipment includes 31 portable welding machines. It is interesting to note that in connection with the welding of the spring cage chain the units are placed next to each other on a stand so that the welder can transfer the welding rod instantly from one unit to the adjoining one without breaking the welding arc.

Thirty-six railroads now are employing the Evans auto-loader. Since the middle of 1932, when production first started, more than 10,000 loaders, calling for a total of 15,000 tons of steel, have been purchased by American carriers at an expenditure of approximately $4,000,000.

Luminous Flame Forging With Gas

(*Concluded from Page 20*)

into the furnace to form a raw gas blanket about the work being heated.

Still another group of slot type forge furnaces with 6-ft. hearth are fired with gas burners utilizing a premixed gas-air mixture gas enriched to produce a luminous flame. This mixture is supplied by a fan blower which receives its gas through a small gas pipe into the intake at the center and air through the remainder of the opening of the intake which is covered with an adjustable shutter. Single or multiple nozzles are utilized with this mixture.

Interesting practice in this plant includes the forging of a freight car truck lever connector (40 in. long). This is formed from 1⅝-in. stock, first one end and then the other, and the different operations are as follows:

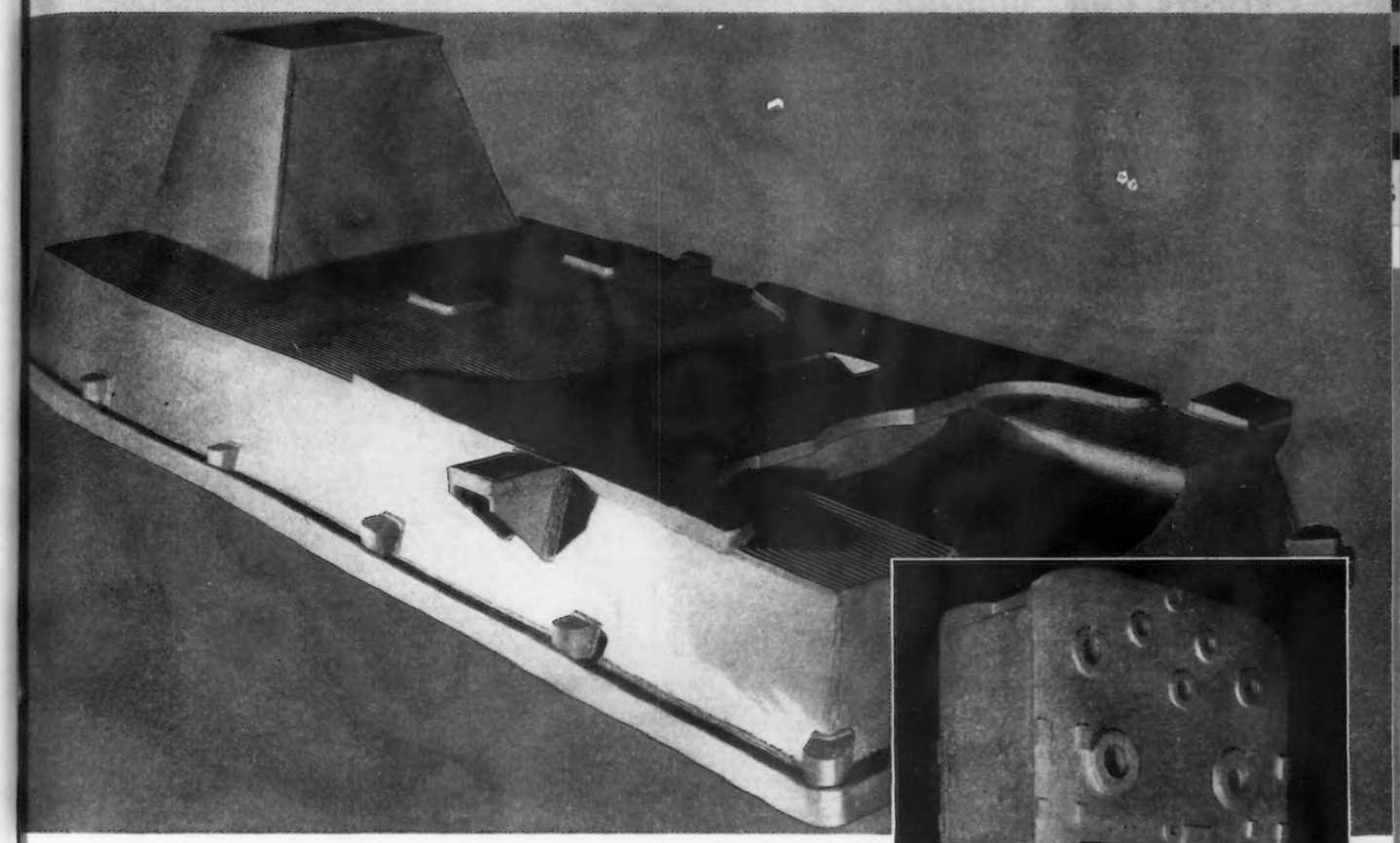
1. Heat in gas furnace.
2. Upset one end.
3. Drop forge end impression.
4. Trim and punch.
5. Spread and set in first upsetter.

This is all done on one heat of 2100 deg. F. This connector was developed and patented at the plant.

A new designation has been gaining wide acceptance for the American Engineering Council by styling it the Washington Embassy for engineers and engineering. The Council, which is a federation of engineering societies, organized some years ago to crystallize facts respecting activities of the country calling for engineering data and opinion, is now under the guidance of Frederick M. Feiker as executive secretary. He was formerly chief of the Bureau of Foreign and Domestic Commerce of the Department of Commerce. Headquarters are at 744 Jackson Place, Washington.

A Dwight-Lloyd sintering machine which is being installed at the new steel works now under construction for Stewarts & Lloyds at Corby, near Kettering, England, will have a capacity of 1000 tons of sintered material each 24 hr. ready for the blast furnace. Northamptonshire iron ores are to be treated, as well as mill scale and blast furnace flue dust.

ELECTRODE EFFICIENCY—NOT PRICE DETERMINES WELDING COSTS

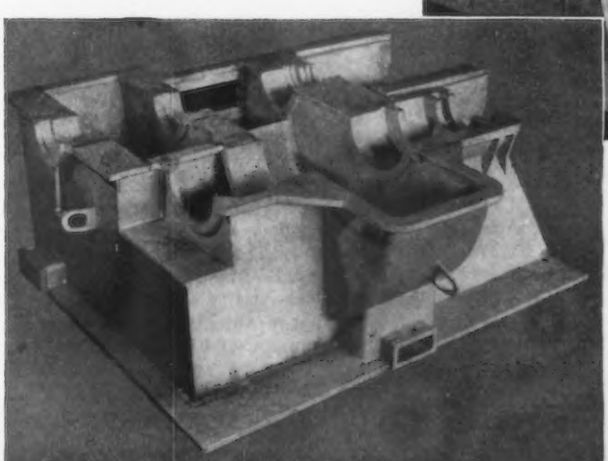


IT'S electrode efficiency that counts most in cutting welding costs. Price is but a minor factor. The electrode that saves the most time and does the best job is certain to be the most economical to use, especially in production work.

Murex Electrodes are more efficient. Tests by many users prove this to be so. A shipbuilding company, for example, finds their rate of deposit 14% more rapid; a manufacturer of oil field equipment says that, in 20 minutes, Murex will weld a seam that ordinarily requires 26 minutes. Users also find they need fewer Murex Electrodes to do a given job, "20% less," to quote a well known builder of refrigerating machinery.

Greater strength and ductility are also Murex characteristics. In combined tests of two of the above concerns, a fabricator of pressure vessels, and a large welding company, Murex deposited metal shows an average tensile strength of 68,335 pounds per sq. in., and an average elongation of 31.44%.

The superior qualities of Murex Electrodes are due to their Heavy All-Mineral Coating. A comprehensive booklet describes the principle and operation of this coating. Write for a copy.



Illustrations show: Above, 14 ft. base for 600 h. p. rotary engine; huge punch press frame, twenty-two ft. high, weighing 104,360 lbs.; Left, 11 ft. x 10 ft. gear case for steam turbine and hydraulic clutch. All these products welded with Murex. Photos courtesy Lukenweld, Inc.

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Albany — Chicago — Pittsburgh
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120 BROADWAY, NEW YORK, N. Y.

MUREX

January Steel Imports Lower Exports Off Slightly

UNITED STATES exports of iron and steel products in January amounted to 178,023 gross tons, declining slightly from the 184,585 tons reported in the preceding month, but amounting to more than three times the movement of January, 1933, when only 56,710 tons was shipped out of the country. However, the January, 1934, decline from the preceding month was more than covered by the decrease in scrap shipments which totaled 87,272 tons, as against 100,983 tons in December.

Exports of tin and terne plate rose to 21,118 tons in January as compared with 18,971 tons in December and with only 4433 tons in January, 1933. Wire rods also reflected a substantial gain, export movement having amounted to 7011 tons in January, 1934, 3210 tons in the preceding month and 711 tons in January, 1933.

The month's decline in imports of iron and steel products was much more pronounced, January movement having amounted to 22,653 tons, as compared with 31,310 tons in the preceding month and with 21,595 tons in January, 1933. Pig iron importations declined to 11,886 tons from 15,531 tons in December. However, only 6444 tons of iron was brought into the country in January of last year. As in the past, the Netherlands were the principal source of pig iron importations, with British India and Canada following in the order named.

Importations of practically all finished steel products reflected declines, the rolled and finished classification having included only 7183 tons in January, compared with 9775 tons in December and with 10,373 tons in January, 1933.

Exports of Iron and Steel from the United States

(In Gross Tons)

	January 1934	January 1933
Pig iron	326	371
Ferromanganese	....	....
Scrap	87,272	31,803
Pig iron, ferroalloys and scrap	*87,598*	*32,174*
Ingots, blooms, billets, sheet bars	455	91
Skelp	819	157
Wire rods	7,011	711
Semi-finished steel	*8,285*	*959*
Steel bars	3,316	1,085
Alloy steel bars	388	30
Iron bars	112	23
Plates, iron and steel	2,487	352
Sheets, galvanized steel	4,816	2,452
Sheets, galvanized iron	107	35
Sheets, black steel	5,748	2,557
Sheets, black iron	142	123
Hoops, bands, strip steel	2,901	944
Tin plate; terne plate	21,118	4,433
Structural shapes, plain material	1,143	581
Structural material, fabricated	2,084	369
Tanks, steel	480	479
Steel rails	12,267	2,320
Rail fastenings, switches, frogs, etc	3,832	385
Boiler tubes	498	302
Casing and oil line pipe	5,786	1,161
Pipe, black and galvanized, welded steel	3,656	1,316
Pipe, black and galvanized, welded iron	144	77
Plain wire	3,518	390
Barbed wire and woven wire fencing	2,335	892
Wire cloth and screening	36	40
Wire rope	284	107
Wire nails	866	601
Other nails and tacks	308	215
Horseshoes	22	3
Bolts, nuts, rivets and washers, except track	424	185
Rolled and finished steel	*78,818*	*21,457*
Cast iron pipe and fittings	1,090	434
Malleable iron screwed fittings	335	112
Car wheels and axles	306	777
Iron castings	613	319
Steel castings	93	48
Forgings	258	203
Castings and forgings	*2,695*	*1,893*
All other	627	227
Total	178,023	56,710

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	January 1934	January 1933
United Kingdom	....	....
British India	4,150	3,209
Germany	....	....
Netherlands	6,681	2,069
Canada	1,055	162
France	....	....
Belgium	....	....
Norway	....	....
Sweden	....	....
All others	....	1,004
Total	11,886	6,444

Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	January		
	Iron Ore		Manganese Ore
	1934	1933	1934
Canada	....	....	426
Cuba	....	150	....
Chile	65,942	....	....
Spain	....	....	....
Sweden	....	....	....
French Africa	....	....	....
Russia	16,910	6,800	798
India	....	....	648
Brazil	....	....	1,077
Africa	....	....	4,207
Other countries	6,406	7,134	....
Total	89,258	14,084	7,156

Imports of Iron and Steel Products into the United States

(In Gross Tons)

Commodity	January 1934	January 1933
Pig iron	11,886	6,444
Sponge iron	45	....
Ferromanganese and spiegeleisen*	1,413	3,256
Ferrochrome†	1	....
Ferrosilicon‡	35	4
Other ferroalloys	....	1
Scrap	1,160	212
Pig iron, ferroalloys and scrap	*14,540*	*9,917*
Steel ingots, blooms, etc	54	3
Wire rods	747	1,196
Semi-finished steel	*801*	*1,199*
Concrete reinforcement bars	46	266
Hollow steel bars	61	87
Merchant steel bars	1,033	1,664
Iron bars	46	16
Iron slabs	1	1
Boiler and other plate	17	40
Sheets, skelp, and saw plate	488	1,237
Tin plate	3	19
Structural shapes	1,030	1,673
Sheet piling	....	....
Rails and rail fastenings	190	201
Welded pipe	255	280
Other pipe	527	77
Barbed wire	1,549	1,717
Round iron and steel wire	258	155
Flat wire and strip steel	49	65
Wire rope and strand	145	127
Other wire	2	225
Hoops and bands	823	1,445
Nails, tacks, and staples	605	1,007
Bolts, nuts, and rivets	28	20
Other finished steel	27	51
Rolled and finished steel	*7,183*	*10,373*
Cast iron pipe and fittings	2	54
Castings and forgings	127	52
Total	22,653	21,595

*Manganese content only.
†Chromium content only.
‡Silicon content only.

W. W. Sly Mfg. Co. Celebrates 60th Birthday

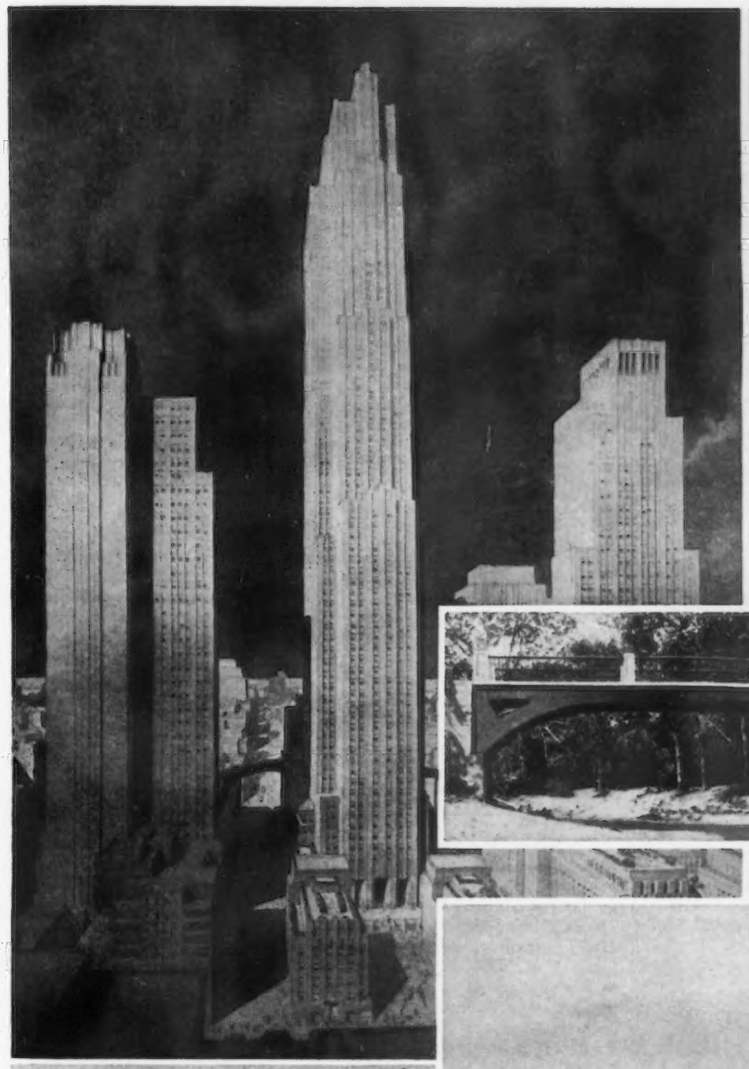
THIS year marks the 60th anniversary of the founding of The W. W. Sly Manufacturing Co., Cleveland, pioneers in foundry cleaning room equipment and positive dust collection.

After an intimate contact over a number of years with the foundry industry, W. W. Sly, the founder of this company, established his own business in 1874 for the manufacture and sale of tumbling mills of the exhaust type, which was his invention. He soon realized the necessity of collecting the dust from the tumbling mills in a positive manner and developed and put on the market the Sly cloth screen type dust arrester. This specialization in casting cleaning equipment soon led to the first developments of the present extensive line of Sly blast cleaning equipment.

The use of these three principal items of the Sly line—tumbling mills, dust collecting equipment and blast cleaning—soon extended into other industries with respective installations for a great variety of purposes, all over the United States, Canada and foreign countries.

The Sly organization comprises engineering facilities of considerable extent and a manufacturing plant with modern facilities, including a tin shop for dust piping systems, a sheet metal shop, a plate shop for light and heavy work, a structural shop, an extensive machine shop and a wood-working department.

From a small beginning this company has gradually grown to its present size, with representatives in New York, Chicago, Detroit, Milwaukee, St. Louis, Minneapolis, Seattle, Los Angeles, Chattanooga and Houston; also Toronto. Headquarters are at 4700 Train Avenue, Cleveland.



No Job

—too Large

—too Small

—too Difficult

ABOVE—Rockefeller Center, New York, largest project of its kind in the world. To date, approximately 84,000 tons of structural steel have gone into this project.

CENTER—Small Foot Bridge of pleasing beam-arch design, 8 feet wide and 60 feet long, in Monument Valley Park, Colorado Springs, Colo. About 12 tons of structural steel required.

RIGHT—Bayonne Bridge, over Kill van Kull, New York, longest arch span in the world. Required 26,000 tons of steel, in the fabrication and erection of which unusual and difficult engineering problems were involved.

FOR the loftiest skyscraper or the mightiest river span and equally for the smallest footbridge or tower, American Bridge Company is prepared to fabricate and erect the necessary steel framework. For the most trying conditions or demands, American Bridge Company engineers may be relied on to find a suitable procedure. Bridges, buildings, elevated and subway structures, towers, barges, turntables—on any project or requirement, large or small, involving structural steel, the experience of American Bridge Company is at your service and our advantageously located plants offer unusual facilities as to capacity and economical production.

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TRUE RUNNING because the spirals are balanced . . . woven alternately right and left. This eliminates the tendency to creep sideways.

FLAT because the spirals are not woven into each other but are connected by the crimped reinforcement member.

HOLD ITS SHAPE. The crimped reinforcement member prevents shrinkage in width. Because the width remains constant there is no tendency of undue elongation.

FLEXIBLE. The free movement of the loop of the spiral on the reinforcement member makes this belt the most flexible woven metal belt yet devised.

The Balanced Spiral is made in all sizes and all kinds of wire. Each belt is fabricated only after due engineering analysis from data given on a questionnaire by the user. Thus every Wissco Belt is built for a specific service.

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; *Pacific Coast Headquarters:* San Francisco; *Warehouses:* Los Angeles, Portland, Seattle; *Export Sales Dept.:* New York City.

WISSCO CONVEYOR BELTS

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41 East 42nd St., New York City

I would be pleased to receive one of your new Handbooks on Metal Conveyor Belts.

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Company .....

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JUST BETWEEN US TWO

Look, Look! We Did A Good Deed

LIKE most *homo saps.*, we are not averse to doing a good deed every now and then provided people know about it. We view with vast puzzlement those individuals who contribute $1,000 to the horse fountain fund, the Odd Fellows' clambake deficit, the Samuel Insull statue fund, etc., and say, "Withhold my name."

Our boy scout acts are never born to blush unseen. So we just want to remind the reader who sent a copy of Mar. 8 IA and the current *New Yorker* to A. E. Donovan, Florence, Mass., that he didn't put enough postage on the envelope. The post office returned the envelope to us. We added the stamps and remailed the copies to Mr. Donovan.

We seen our duty; we done it gladly, as long as everybody knows about it.

This Has Gone Far Enough

UP to now all this talk in the newspapers about the dangers of growing nationalism has left us unperturbed. What of it? we said. It can't affect us, and besides, those furriners are always stirring things up. America for Americans, Andorra for Andorrans, Latvia for Latvians. You get the idea.

Like Queen Victoria, we were neither amused nor alarmed. *But now we are frantic.* An old subscriber, Emil Costinescu, Sinaia, Rumania (manufacturer of screw machine products, writes:

> *"We are very sorry not to be able to receive The Iron Age any longer. It is impossible to find dollars in Rumania. Can you think of any other way in which we could pay you?"*

Feverishly we phoned the Guaranty Trust Co., foreign exchange specialists. All we could get out of them was something about a "blocked account," which as we understand it is unblocked as to income but blocked as to outgo. That won't help.

Can't somebody do something? Are we going to have to lose an important subscriber without putting up a fight? What is the League of Nations for? Can't Sec. Morgenthau arrange a loan to Rumania? We'll guarantee it to the extent of $12. Can't we import some Rumanian wine, rûm or whatever Rumanians make? This is terrible! We would even write to our Congressman if we knew his name.

Weeky Blurb

DESPITE our distaste for superlatives, our passion for accuracy compels us to pass along, untoned down, this comment by a gentleman of considerable influence in the field:

> **"Unquestionably the best paper in the industry is ————(three guesses)————The Iron Age."**

Eyes Wide, Nostrils Twitching

A EUROPEAN manufacturer is as eager as the next one to turn over an honest pengo, escudo, peseta, dinar, krone, thaler, drachma or lira. And what do you think he does when he sees American goods selling at a 40½ per cent discount, due to our 59½¢ dollar? Why, sezee, here's an opportunity to pick up some bargains.

The closest thing to an industrial Almanach de Gotha is Iron Age's foreign circulation. If you're in IA you're reaching most of the big fellows abroad as well as here, and you are exposing yourself freely to foreign trade.

Just Under the Wire

OUR contract calls for us to confine this calliopic column to things germane to the industry. It wouldn't be wise to go writing all over the lot, would it? Certainly not. This poem, relayed by *Advertising Age*, is included only because it was written by a member of the advertising profession, Miss Nancy Bell of the Frisco Ad Club, and also because we think the poem is swell:

> *"Lady, please unlax a mite,*
> *And be my Valentine tonight.*
> *You surely have so many virtues,*
> *To lose a couple would not hurt youse."*
>
> —A.H.D.